

註_{ㄓㄨˋ}、音_{ㄧㄣ} 大_{ㄉㄚˋ}、師_{ㄕㄨ} 班_{ㄅㄢ} Zhuyin Masterclass

An Introduction to Symbols in Mandarin

Created by NaZz on May 22, 2020

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Preface 〈序〉

The beginning of *Zhuyin Masterclass* series covers characters used in Standard Mandarin. Funnily, the English title sets a word pun on "Zhuyin", which is a Latinization of many words, like 注音 or even 主音! Therefore, I replace 注 with 註, which instead generalizes 註音 as "Annotating Sound".

Since the style of my guide is unlike majority of guides, which are very direct in teaching material, its goal is not only to teach the readers the system, but also to show them that it can be learned through outside concepts and experience without any complication.

Firstly, the most important sense emphasized throughout the whole guide is "sight", which starts in Section 1. Since characters used in Chinese are not presented the same way as Latin alphabets that many of us are familiar with, I introduce basic applications and ideas of the system. Without an introduction, the idea behind the system will be lost.

Secondly, I introduced my own perspective of Chinese phonology, which involves all senses I mentioned. Since phonology involves relationships between sounds and signs, "hear" is emphasized. Also, since sounds are produced through our essential parts of the mouth or nose, "touch" and "feel" are emphasized. There are several reasons why I did not decide to teach phonology before the writing:

1. Learners would be daunted by the characters for the first time, which force them to practice reading and writing more than listening and speaking (or vice versa, depending on their preferences)
2. Teaching phonology altogether with written characters mixes up multiple senses, which makes Section 1 the least important.

Even though the traditional approach may be as simple as it seems, the issue is that it can take too much trial-and-error to figure out one's own weak points. When reading out loud and writing at the same time, the brain signals multiple actions being performed at the same time. However, that does not clearly explain any accurate relationship between one's levels of certain abilities and one's level of knowledge. For instance, one who follows that method for an enough period of time claims to be familiar with writing, but cannot measure one's own capability of speaking. So the best way to teach is to consider one part to focus on. There is no need to rush through the whole learning process.

From my experience, I see learning as an endless process of life. Even though my major is not linguistics, my interest in linguistics is heavily inspired by mathematics and science. Since I experienced many teaching and different learning styles for more than 10 years, I used that to develop and share my strategies.

1 Introduction 〈導論〉

Table 1. Zhuyin Chart 〈注音列表〉

聲母						介音	韻母			
ㄅ	ㄆ			ㄇ			ㄚ	ㄛ	ㄜ	
ㄊ	ㄎ	ㄨ	ㄩ	ㄣ	ㄛ	一	ㄛ	ㄜ	ㄝ	
ㄌ	ㄋ	ㄣ	ㄨ	ㄣ	ㄛ	ㄨ	ㄛ	ㄜ	ㄝ	
ㄋ	ㄌ	ㄣ	ㄨ	ㄣ	ㄛ	ㄨ	ㄛ	ㄜ	ㄝ	ㄟ
ㄅ	ㄆ	ㄇ	ㄏ	ㄏ	ㄏ		ㄚ	ㄛ	ㄜ	其他

注音 (Pinyin: *Zhùyīn*; Zhuyin: ㄅㄆㄇㄏㄎㄌ; literally "annotate sound"; also known as *bopomofo* ㄅㄆㄇㄏㄎㄌ) is the major pronunciation transcription guide for Mandarin Chinese and some other languages. Like some non-Latinized systems, including Japanese writing system, which uses *kanji* (漢字¹), *hiragana* (平仮名¹) and *katakana* (片仮名¹), it became dominant not only in reading and writing 漢字 (*hànzì*; ㄆㄆㄆㄆ; literally "Han ideograms/characters" or "characters from Han dynasty"), but also in many other occasions, including expressing phonetics. Because 注音 has highly sophisticated features different from Latin characters, the best way to use this guide is to learn from the start.

Remark. Since this guide is designed for those who are interested in learning 注音 primarily used in Chinese languages, 漢字 introduced in the first place are used throughout the material. The point of doing this is to absorb the right feels with shapes emphasized in those characters. The recommended approach is to read this guide from the start, so that

1. It becomes easier to recognize characters through exposure;
2. And that we understand where whole points come from. There are plenty of cross-referencing involved.

Remark. Since there are also those who are interested in typing 注音, Table 1 is formatted consistently with the typical input used in practice. For your future reference, prepare either Table 1 or 注音 input, which can be very useful in hand. The top (which categorizes characters by their functions) and the bottom (which categorizes characters by their phonetic readings) rows both serve important purposes of the characters used in the material.

¹Since Japanese uses Chinese characters, I changed the font for distinction.

1.1 System 〈系統〉

Since 1892, a revolution of Chinese pronunciation started with intellectuals who planned to transform 漢字 into readings. The phonologist 章炳麟 (*Zhāng Bǐnglín*; 虫九 ㄅㄣ ㄌㄧㄣ ㄘㄩ ㄉㄧㄣ ㄌㄧㄣ ㄘㄩ ㄉㄧㄣ) was known for his works 紐文 (*Niǔ Wén*; ㄋㄧㄡ ㄨㄣ ㄨㄣ ㄨㄣ) and 韻文 (*Yùn Wén*; ㄩㄣ ㄨㄣ ㄨㄣ ㄨㄣ). created in the beginning of 20th century since his refuge in Japan. Since 漢字 makes great use with the method 反切 (*fǎnqiè*; ㄈㄢ ㄑㄧㄝ ㄑㄧㄝ ㄑㄧㄝ), which is used to indicate the reading of one 漢字 by the representation of other 漢字 (i.e. 東 was spelled by 德 and 紅), the phonetic transcription became inconvenient. Therefore, 章炳麟 employed Japanese *kana* (仮名) script and simplified radicals for his works.

The term 注音 is literally "annotate the readings of characters". Its name came from the term 切音字 (*qièyīnzì*; ㄑㄧㄝ ㄧㄣ ㄗㄧ ㄗㄧ) during the early years of the Republic of China (recognized as Taiwan). It was announced as 注音字母 (*Zhùyīn Zìmǔ*; ㄗㄩ ㄧㄣ ㄗㄩ ㄗㄩ ㄗㄩ ㄗㄩ), which was literally "phonetic alphabets". The National Ministry of Education made some adaptations on the system 注音 since 1930. Nowadays, it became a learning tool not only in Taiwan, but also overseas.

To start, I would like to introduce characters before delving into their usages and origins. Unlike Latin/Roman alphabet systems, including Chinese romanization system *pīnyīn* (Chinese: 拼音), 注音 characters are not listed in the order of its Latin-alphabet reading. As Table 1 depicts, the characters are categorized in sets of sounds:

1. The characters in the red cells fall in the category of 聲母 (*shēngmǔ*; ㄕ ㄌ ㄆ ㄇ ㄈ ㄇ ㄈ), which is "consonants" in Chinese.
2. The characters in the green cells fall in the category of 介音 (*jièyīn*; ㄟ ㄠ ㄡ ㄢ ㄣ ㄤ), which is "medials" in Chinese.
3. The characters in the blue cells fall in the category of 韻母 (*yùnmǔ*; ㄩ ㄣ ㄨ ㄣ ㄨ ㄣ), which is "rhyme" in Chinese.

For each of the categories,

1. 聲母 are listed in the order of place of articulation, starting with ㄅ. The order is from top to bottom and then, from left to right.
2. 介音 are listed from top to bottom.
3. 韻母 are categorized by how complex finals are. Like 聲母, they start at the top-left, which is ㄩ. The order runs from top to bottom and then, from left to right.

Furthermore, these symbols have very rich amount of origin, involving both phonology and components. As shown in Table 1.1a, 1.1b and 1.1c, they borrowed readings from other characters.

Table 1.1a. Consonant Origins 〈聲母原型〉		
注音	Origin	Remarks
㇏ (b)	包	Top component of 包 (<i>bāo</i> ; ㇏ㄠ).
㇏ (p)	扑	Ancient form of 扑 (<i>pū</i> ; ㇏ㄨ).
冂 (m)	冂	Top component of 冂 (<i>mì</i> ; 冂一).
匚 (f)	匚	Similar to 匚 (<i>fāng</i> ; 匚㇏).
㇏ (d)	刀	Pictogram of 刀 (<i>dāo</i> ; ㇏ㄠ).
㇏ (t)	突	Ancient form of 突 (<i>tū, tú</i> ; ㇏ㄨ, ㇏ㄨ).
㇏ (n)	乃	Variant form of 乃 (<i>nǎi</i> ; ㇏ㄣ).
㇏ (l)	力	An ancient form of 力 (<i>lì</i> ; ㇏一).
㇏ (g)	澮	Ancient form of 澮 (<i>kuài, guài</i> ² ; ㇏ㄨㄣ, ㇏ㄨㄣ).
㇏ (k)	考	Bottom component of 考 (<i>kǎo</i> ; ㇏ㄠ).
㇏ (h)	𠂇	Similar to the character 𠂇 (<i>hǎn</i> ; 𠂇㇏).
㇏ (j)	糾	Right-hand component of 糾 (<i>jiū</i> ; ㇏一).
㇏ (q)	𠂇	An ancient form of 𠂇 (<i>quǎn</i> ; ㇏ㄣ).
㇏ (x)	下	Ancient form of 下 (<i>xià</i> ; ㇏一).
㇏ (zhi, zh)	之	Ancient form of 之 (<i>zhī</i> ; ㇏).
㇏ (chi, ch)	行	Left-hand component (<i>chì</i> ; ㇏) of 行.
尸 (shi, sh)	尸	Variant form of 尸 (<i>shī</i> ; 尸).
㇏ (rì, r)	日	Inscription form of 日 (<i>rì</i> ; ㇏).
㇏ (zì, z)	卩	An ancient form of 節 (<i>jié, zì</i> ³ ; ㇏一, ㇏一).
㇏ (cì, c)	七	An ancient form of 七 (<i>qī, cī</i> ⁴ ; ㇏一, ㇏一).
㇏ (sì, s)	厶	The right-hand component of 私 (<i>sī</i> ; 厶).

Table 1.1b. Medial Origins 〈介音原型〉		
注音	Origin	Remarks
一 ⁵ (yī, i)	一	Resembles the Chinese character 一 (<i>yī</i> ; 一).
㇏ (wū, u)	五	Ancient form of 五 (<i>wǔ</i> ; ㇏).
㇏ (yū, ü)	去	Follows the reading of 去 (<i>qù</i> ; ㇏).

²*guài* is the alternate reading of 澮, whereas *kuài* is the reading currently used.

³*zì* is the old reading of 節.

⁴*cī* is the old reading of 七.

⁵The vertically written symbol is also equivalent to the horizontal 一.

Table 1.1c. Rhyme Origins 〈韻母原型〉		
注音	Origin	Remarks
ㄚ (a)	ㄚ	Resembles the Chinese character ㄚ (<i>yā</i> ; 一ㄚ).
ㄛ (o)	呵	An ancient form of 呵 (<i>ō</i> ; ㄛ).
ㄝ (e)	ㄝ	Transformation from ㄝ.
ㄞ (ê)	也	An ancient form of 也 (<i>yě</i> ; 一ㄞ).
ㄞ (ai)	亥	Resembles the Chinese character 亥 (<i>hài</i> ; ㄞ).
ㄟ (ei)	飛	Follows the reading of 飛 (<i>fēi</i> ; ㄟ).
ㄠ (ao)	么	Resembles the Chinese character 么 (<i>āo</i> ; ㄠ).
ㄡ (ou)	又	Resembles the Chinese character 又 (<i>yòu</i> ; 一ㄡ).
ㄢ (an)	函	Related to the variant form of 函 (<i>hán</i> ; ㄢ).
ㄣ (en)	隱	Ancient variant form of 隱 (<i>yǐn</i> ; 一ㄣ).
ㄤ (ang)	尙	Ancient form of 尙 (<i>wāng</i> ; ㄤ).
ㄥ (eng)	肱	Ancient form of 肱 (<i>gōng</i> ; ㄥ).
ㄦ (er)	兒	Bottom component of 兒 (<i>ér</i> ; ㄦ).

where

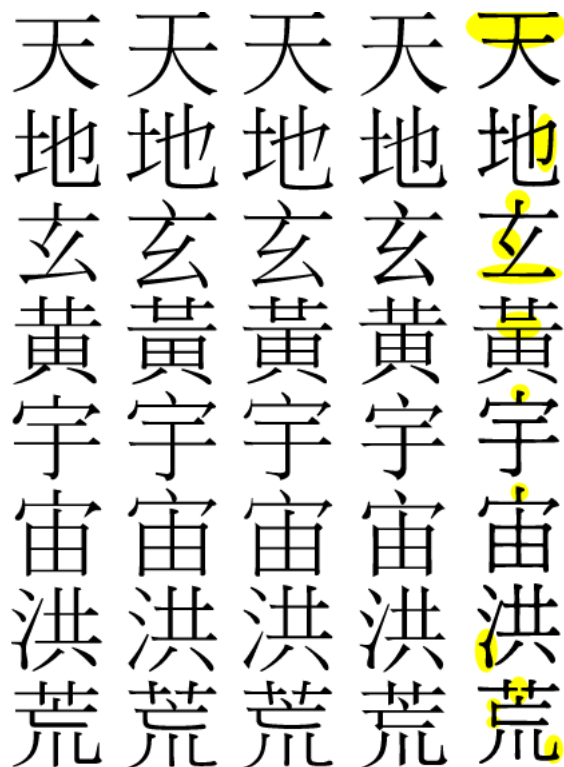
- The readings indicated next to 注音 characters are in *pīnyīn*, which *approximates* their English pronunciations. The reason is that their sounds do not *exactly* correspond to actual readings of characters. Further discussion on phonology continues at the end of this subsection.
- The term "component" refers to the radical of character specified. Further explanation and examples are given in Subsection 1.3.
- Ancient forms refer to earlier forms of 漢字 in the regular script (Subsection 1.2) used currently. For instance, the ancient form of 草 is 艸, which was derived from the pictogram.
- Variant forms (in Chinese, 異體字; *yìtǐzì*; 一ㄣ ㄣ ㄣ) are 漢字 that consist of same readings and meanings, but of different representations. For instance, the variant form of 國 is 国⁶. Few types of variants are "orthodox characters" (正字; *zhèngzì*; ㄣ ㄣ ㄣ) and "popular characters" (俗字; *súzi*; ㄣ ㄣ ㄣ). 正字 can typically be found in works, such as 康熙字典⁷ (*Kāngxī Zìdiǎn*; ㄣ ㄣ ㄣ ㄣ ㄣ), handwriting and textbooks. 俗字 are characters that are used in informal occasions. The reason that those characters come with multiple forms is mainly due to the divergence in standard characters for certain regions (ROC, Hong Kong, Japan and Taiwan). While we see common characters, such as 強 (apart from 彊, which is

⁶Even though 国 is simplified, it is also a variant by the transformation of the enclosed content.

⁷Literally "Kangxi Dictionary"

its alternate form), it is not uncommon that all show intriguing presence of strokes, radicals and shapes.

例 (Example)



Those are different ways to encode each character. From right to left: 康熙字典 form, PRC standard, Hong Kong standard, Taiwan standard, Japanese standard.

The sets of allographic characters above are different ways to encode them in Unicode, which is due to the process of Han unification. That is: some characters are presented similar to each other on web pages, documents or similar. The correct variant displayed depends on typefaces and code points.

Here are tonal marks used in Mandarin Chinese:

Table 1.1d. Tonal Marks 〈聲調〉		
Number	Marker	Remarks
1	ˉ	Modifier letter macron (usually omitted); high tone
2	ˊ	Modifier letter acute accent; rising tone
3	ˇ	Caron; low (dipping) tone
4	ˋ	Modified letter grave accent; falling tone
5	˙	Dot above; neutral tone

where

- **Tone 1** denotes a steady high sound.
- **Tone 2** denotes a sound rising from middle to high pitch.
- **Tone 3** denotes a sound falling mid-low to low and then, rising.
- **Tone 4** denotes a sharp fall from high to low.
- **Tone 5** denotes a "short" tone, which works differently from Tone 1. That is typically used in weak syllables, for instance, 媽媽 (*māma*; ㄇㄚˊ ㄇㄚˊ), where the tone of the last 媽 changes.

With all these tables, the pattern of generating 注音 reading is:

語音 = 聲母 (Consonant) + 介音 (Medial) + 韻母 (Rhyme) + 聲調 (Tone)

if 聲調 (*shēngdiào*; ㄅㄛˊ ㄅㄛˊ) can either be empty or contain Tone 1, 2, 3, 4 or 5. Sometimes, readings can start with Tone 5 as follows:

語音 = ˙ (Dot mark) + 聲母 (Consonant) + 介音 (Medial) + 韻母 (Rhyme)

In ruby characters⁸, the order of expressing 注音 matters, which is suggested by the etymology behind those character groups:

1. 聲母 is literally "sound mother". However, it can also be literally translated as "sound origin" or "the beginning of sound". Therefore, the definition given is "initials". In Chinese, 聲母 is defined as "consonants" since 注音 readings can exclude 聲母.
2. 介音 is literally "in between sounds", which can be translated as "medials".
3. 韻母 is literally "rhyme mother", which suggests either "finals" or "rhymes".

例 (Example)

Ruby characters, which are indicated on the right of each character, are read from top to bottom. In this case, the reading is ㄨ ㄨ ㄨ ㄨ from left to right. The reading of ruby characters is still the same when positioned either above or below.

Before you proceed to the exercises, read the information, starting at Section 1. Then, try out the following exercises to the best of your ability without looking. The answers to those problems can be found, starting in Page 53.

問題 1 (Exercise 1)

Identify the category of each characters, using 聲母 (Consonants), 介音 (Medials) or 韻母 (Rhymes).

⁸Ruby characters are small annotations that guide readers the specific readings of characters shown.

(a) ㄚ	(f) ㄘ	(k) ㄎ	(p) ㄆ
(b) ㄣ	(g) ㄍ	(l) ㄌ	(q) ㄑ
(c) ㄛ	(h) ㄏ	(m) ㄇ	(r) ㄖ
(d) ㄨ	(i) ㄟ	(n) ㄣ	(s) ㄙ
(e) ㄜ	(j) ㄐ	(o) ㄛ	(t) ㄊ

問題 2 (Exercise 2)

Determine

- (a) The number of characters in 聲母;
- (b) The number of characters in 介音;
- (c) And the number of characters in 韻母,

such that they appear in Table 1, but not in the list from Exercise 1.

Fun Remark. Table 1 resembles a typical 注音 keyboard input. Before you give up or take a quick peek at inputs or outside references, do your best to figure out how it is being structured.

問題 3 (Exercise 3)

For each of the following statements, determine whether it is true (正) or false (誤):

- (i) Each character used in any of Chinese topolects must have one and only form.
- (ii) For all readings that contain 聲母, the one and only character that is positioned in front must be 聲母.
- (iii) All 注音 borrowed readings directly from 漢字.
- (iv) As of Section 1, there are more 聲母 in the system than 介音 or 韻母.
- (v) Representing 注音 without using 漢字 always has no significance since they represent phonetics.
- (vi) 聲調 can be used alone in some occasions.

From Table 1.1a, 1.1b and 1.1c, we discovered that each of the readings corresponds respectively to its symbol, which then corresponds to its category specified in Table 1. However, the disadvantage is that those readings alone are not enough to prove how these characters are pronounced. While they guide learners to pronounce characters as shown, they lack a clear and technical aspect of *actual* phonology.

例 (Example)

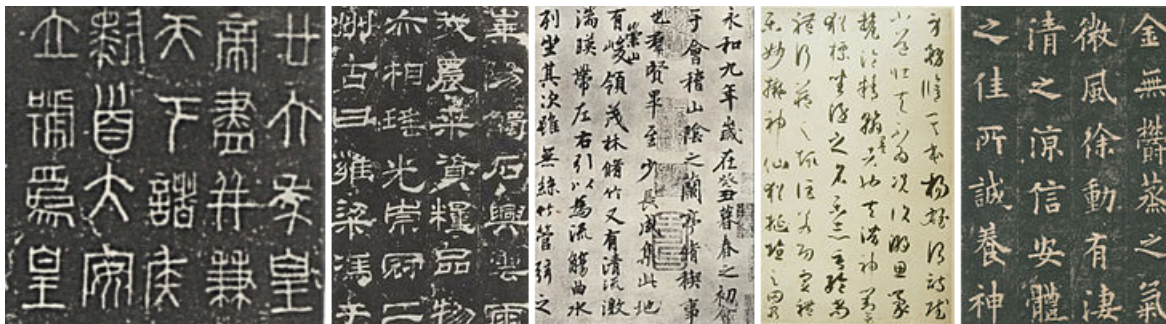
The IPA⁹ of ㄣ is /ən/. An English example is "taken" whose IPA reading is /'teɪkən/. Few Chinese examples are 分 (*fēn*; ㄈㄣ; IPA: /fən/) and 身 (*shēn*; ㄕㄣ; IPA: /ʃən/).

On the other hand, if we consider English versions of 分 and 身, the reading "e" would be incorrectly read as /ɛ/ (which is similar to "e" in the English word "fence"). That is because the reading of "e" depends on 聲母, 介音 and 韻母 taken place.

In short, mastering phonology is arguably essential to succeed in any of Chinese topolects. The example stresses that not all characters are one-to-one with the English readings. Since there are some phonological features those transcriptions lack, it's reasonable to ask ourselves: how can we learn 注音 effectively to improve our perspective on Chinese phonology? Eithout any rote-memorization involved, we carefully analyze their readings entirely from scratch in Section 2.

Warning. Due to high level of technicality, the phonology explained becomes very deep after reading Section 2. Since there are plenty of cross-referencing involved, my advice is to be familiar with shapes first before learning phonology, which will compensate for mixing readings up.

1.2 Handwriting 〈手寫〉



Left to right: Seal, clerical, semi-cursive, cursive, regular

Strokes and characters are very known in various of calligraphy throughout the history. Since Chinese, Japanese, Korean¹⁰ and Vietnamese¹⁰ typography all have intrinsic connections to scripts emphasized during ancient China, it is essential to grasp some ideas of their origins, which will help us gain a deeper insight of the writing technicality and beauty involved. So for this subsection, I would like to briefly introduce concepts that teach us the importance of making connections between Chinese calligraphy and art.

⁹IPA denotes *International Phonetics Alphabets*, which associate characters with phonetics.

¹⁰Currently, Vietnamese and Korean do not use 漢字 in writing. However, it is important not to dismiss the fact that some of their vocabularies were borrowed from other languages, including Chinese and Japanese. For instance, Korean and Vietnamese orthographically borrowed the word 警察 from Japanese. My research proves that Korean 경찰 has similar reading to Japanese 警察 as well as the Sino-Vietnamese reading of 警察.

1.2.1 Chinese Scripts 〈漢字字體風格〉

篆書 (*Zhuànshū*; 𠄎𠄎𠄎 𠄎𠄎) is "seal script" introduced in various of different variants during ancient China. As its literal translation suggests, that style is used on seals, which shows that it heavily emphasizes presentations of oracle bone scripts (Chinese: 甲骨文). Such written characters are recognized by more simplified strokes. That can be found on carved and written artifacts made out of materials, such as wood and/or jade.

隸書 (*Lìshū*; 𠄎𠄎 𠄎𠄎) is "clerical script"¹¹ that was mistakenly said to be derived from the seal script during *Hàn* 漢 dynasty. In fact, the term 隸書 is linked to "vulgar writing", which was inferred in *Qín* 秦 period. Since the character 隸 refers to "low-ranking subordinate, servant", that suggests characters written in 隸書 are thicker and curvier, but also clearer in appearance than those written in 篆書. Because of their strokes, those characters resemble more of a square than a rectangle.

行書 (*Xíngshū*; 𠄎𠄎𠄎 𠄎𠄎) is "semi-cursive script" that spans since the 漢 dynasty. As its literal translation suggests, the strokes of the written characters resemble the normal handwriting.

草書 (*Cǎoshū*; 𠄎𠄎 𠄎𠄎) is "cursive script" that deviates from the standards of writing 漢字. Its literal translation suggests "grass calligraphy". However, it can sometimes be "sloppy script", which suggests written strokes flow into others for drastic simplifications and more elegant appearance. Characters written in 行書 are more presentable than the ones written 草書.

楷書 (*Kǎishū*; 𠄎𠄎 𠄎𠄎) is "regular script" that is highly well-known in typography and calligraphy. Since its literal translation suggests "standard script", that script involves characters with carefully and slowly written strokes. 楷書 is the most elaborate script we explored so far.

¹¹隸書 is also known as 隸字, 佐書 and 史書, which are respectively "clerical characters", "assistant script" and "historical script".

例 (Examples)



For the leftmost diagram, the characters on the left are written in 楷書, whereas the characters on the right are written in 篆書. Because of their differences in representations, 篆書 characters are composed of unique structure and strokes. Their written strokes depend more on space than on standards of writing characters:

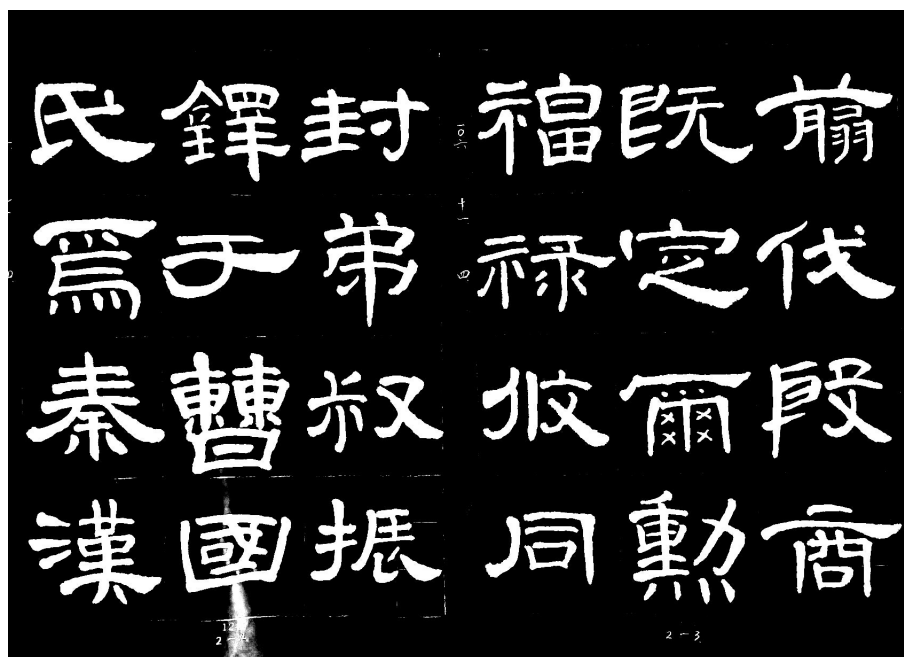
- For the right 篆, the radical form of 竹 are simplified with more vertical strokes. 篆 on the right contains more rectilinear strokes than the one on the left.
- For the right 書, the components are drawn together with one long vertical stroke, so that the components appear to be together.

For the rightmost diagram, each of the writings is labeled by its respective 漢字.

例 (Examples)



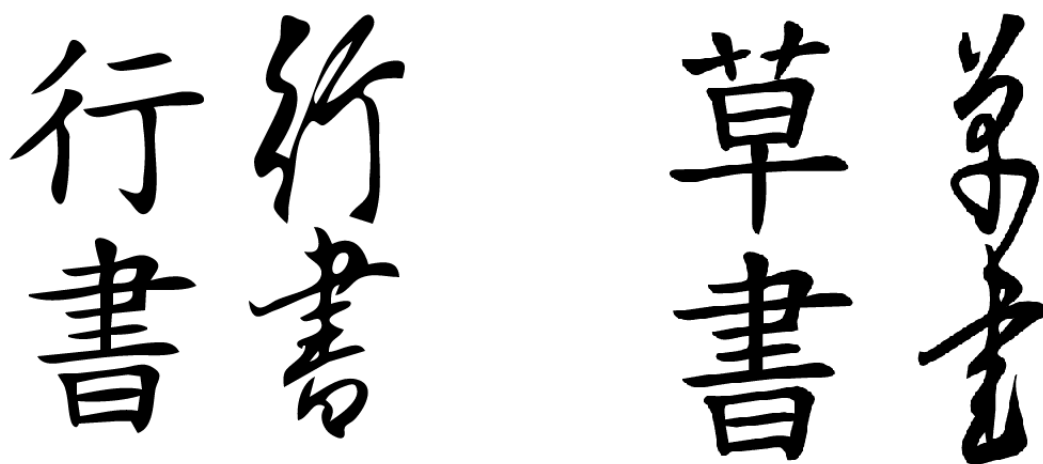
For the leftmost diagram, the characters on the left are written in 楷書, whereas the characters on the right are written in 隸書. They are similar in strokes. For the rightmost diagram, the characters are entirely written in 隸書.



The next image is another way to write 隸書, which resembles 篆書. As shown, the thickness of strokes varies throughout the writing.

Fun Remark. If you do not have a working paintbrush suitable for calligraphy, the cheapest tool to write 隸書 is a working marker (not with a worn out tip) since it is possible to control the thickness desired by varying the holding angle and the pressure applied to the tip. Since all markers work differently from others, experiment first to see if you can achieve some desirable difference in thickness.

例 (Examples)



The leftmost diagram compares characters written in 楷書 and 行書, whereas the rightmost diagram compares characters written in 楷書 and 草書. As shown, 草書 lessens the number

of strokes needed to write a character.

1.2.2 Strokes 〈筆畫〉

While we learned how characters are written in five major scripts, we did not (explicitly) learn the importance of "stroke", concerning their applications. The common method to practice handwriting is to write (or copy) characters as shown or presented. However, it is not enough to prove that it is effective. The ingredient that method lacks is the complete understanding of *fundamental elements of art* emphasized in Chinese calligraphy:

- **Lines** are the key components in writing characters since each defines the stroke direction from one point to another.
- **Shapes** guide us to visualize or approximate appropriate dimensions accordingly.
- Understanding **space** helps us predict the relative radical and stroke positions when handwriting.

Since Chinese stresses those a lot, understanding their key concepts helps us refine our handwriting and also, our perspective on both Chinese linguistics and calligraphy. So before we proceed to handwriting, I would like to introduce 筆畫 (*bǐhuà*; ㄅㄧˇ ㄏㄨㄚˋ), which is "stroke" in Chinese.

筆畫 has some interesting origin, concerning the discoveries during ancient China. Back in *Jin* 晉 dynasty, a Chinese calligrapher 衛鑠 (*Wèi Shuò*; ㄨㄟˋ ㄕㄨㄛˋ) created the rules of writing 楷書. In her book 筆陣圖 (*Bǐzhèn tú*; ㄅㄧˇ ㄓㄣˋ ㄊㄨˊ), she discovered that 漢字 consists of seven types of 筆畫. However, her work was disputed. The calligrapher 智永 of *Sui* 隋 dynasty discovered that by considering the character 永, there are eight types of 筆畫:



1. 點 (*diǎn*; ㄉㄧㄢˇ), which is literally "point". By convention, it is also 側 (*cè*; ㄘㄛˊ), which refers to "slanting".

2. 横 (*héng*; 厂 丿), which is literally "horizontal". By convention, it is also 勒 (*lè*; 力 ㄣ).
3. 豎 (*shù*; 尸 ㄣ), which is literally "vertical". By convention, it is also 努 (*nǚ*; ㄣ ㄣ).
4. 鉤 (*gōu*; ㄣ ㄣ), which refers to "hook". By convention, it is also 趯 (*tì*; 去 一 ㄣ).
5. 挑 (*tiāo*; 去 一 ㄣ), which refers to "picking". By convention, it is also 策 (*cè*; ㄣ ㄣ), which refers to "an upward horizontal stroke".
6. 掠 (*lüè*; 力 ㄣ ㄣ), which refers to "sweeping". That is equivalent to 長撇 (*chángpiě*; ㄣ ㄣ ㄣ), which refers to "a long stroke falling downward toward the left".
7. 啄 (*zhuó*; ㄣ ㄣ ㄣ), which refers to "pecking". That is equivalent to 短撇 (*duǎnpiě*; ㄣ ㄣ ㄣ), which refers to "a short stroke falling downward toward the left".
8. 捺 (*nà*; ㄣ ㄣ), which refers to "a stroke falling downward toward the right". By convention, it is also 磔 (*zhé*; ㄣ ㄣ).

Another type of 筆畫 that I would also like to introduce is 折 (*zhé*; ㄣ ㄣ), which refers to "a change in direction of a stroke". There are also other types of 筆畫, which include 彎 (*wān*; ㄣ ㄣ) and 曲 (*qū*; ㄣ ㄣ). Both of these characters refer to "bent/curved strokes", where

- 彎-stroke (ㄣ) faces to the right;
- And 曲-stroke (ㄣ) faces to the left.

All known 筆畫 are ordered based on their numbers given by GB (*Guóbiāo* 國標) standards. There are some patterns, involving the components in 筆畫.

Table 1.2.2a. Strokes Combination Pt. I 〈筆畫複合1〉		
筆畫	Names	Remarks
一	橫	From left to right; examples are 三, 言 and 花.
ㄟ	斜橫	From bottom to top; examples are 七, 弋 and 戈.
ㄨ	挑	From top to bottom; examples are 刁, 求 and 虫.
ㄣ	點挑	Bottom emphasized more than top; examples are 汁, 冰 and 洗.
丨	豎	From top to bottom; examples are 十, 圭 and 仆.
/	斜豎	From top to bottom; examples are 丑, 五 and 互.
\	右斜豎	From top to bottom; one example is 厶.
㇏	撇	From top to bottom; examples are 竹, 大 and 义.
㇏	啄, 扁撇	From right to left; examples are 千, 乏 and 斤.
㇏	直撇, 豎撇	From top to bottom; examples are 九, 厄 and 月.
㇏	點	From top to bottom; examples are 主, 卜 and 凡.
㇏	長點, 長頓點	Extended 點; examples are 囟, 囟 and 凶.
㇏	左點	From right to left; examples are 心, 恭 and 烹.
㇏	直點, 豎點	From top to bottom; examples are 六, 文 and 空.
㇏	捺, 磔	From top to bottom; examples are 人, 尺 and 木.
㇏	挑捺	Top with 挑; from top to bottom; examples are 文, 爻 and 父.
㇏	橫捺	Top with 橫; from top to bottom; examples are 入, 八 and 内.
㇏	扁捺	Left with 橫; from left to right; examples are 走, 足 and 麵.
㇏	扁捺	Left with 橫; examples are 走, 足 and 麵.
㇏	彎	From top to bottom; examples are 過 and 這.
㇏	曲	From top to bottom.
○	圈, 圓	Counterclockwise from top-right; one example is 〇.

As shown in Table 1.2.2a,

1. The enumeration starts with the horizontal stroke.
2. While rotating it counter-clockwise, it lists other strokes. 斜豎 and 右斜豎 are the strokes positioned after 豎.
3. The strokes after 右斜豎 are less linear than the previous. Therefore, the curviest strokes 彎, 曲 and 圈 come later before the enumeration begins finding any remaining compound 筆畫.

Table 1.2.2b. Strokes Combination Pt. II 〈筆畫複合2〉		
筆畫	Names	Remarks
㇏	橫鉤	From top to bottom; examples are 欠 and 蛋.
㇏	挑鉤	Slanted version of 橫鉤; examples are 也, 乚 and 池.
㇏	橫撇	Bottom with 撇; examples are 夕, 水 and 登.
㇏	橫斜	Straight strokes; examples are 彖, 互 and 恆.
㇏	橫豎, 橫折	Perpendicular strokes; examples are 口, 己 and 典.
㇏	橫豎鉤, 橫折鉤	鉤-version of 橫豎; examples are 而, 永 and 印.
㇏	橫撇鉤	Slanted version of 橫豎鉤; examples are 勺, 方 and 力.
㇏	挑撇鉤	Slanted version of 橫撇鉤; examples are 也, 乚 and 池.
㇏	挑撇鉤, 豎橫折	More turns; examples are 凹, 兕 and 雋.
㇏	橫豎挑, 橫折提	Bottom with 挑; one example is 殼.
㇏	橫曲	Curvy bottom stroke; examples are 沿 and 沒.
㇏	橫曲鉤	鉤-version of 橫曲; examples are 九 and 几.
㇏	橫捺鉤, 橫斜鉤	More angular than previous; examples are 風 and 迅.
㇏	橫撇曲鉤, 橫曲鉤	Bottom curvier than top; examples are 九 and 几.
㇏	橫撇彎	Cusp formed; examples are 過 and 這.
㇏	橫撇橫撇	Contains angular stroke; examples are 延 and 巡.
㇏	橫撇彎鉤	Contains curvier strokes; examples are 陳 and 耶.
㇏	橫豎橫豎, 橫折橫折	More turns; one example is 凸.
㇏	橫撇橫撇鉤, 橫撇橫折鉤	Curvy bottom stroke; examples are 乃 and 盈.

In Table 1.2.2b, those 筆畫 are in increasing order of component complexity. As we scroll down the list, the curvature of the final stroke changes gradually within some sequences of similar 筆畫. For instance, from ㇏ to ㇏, the final stroke becomes curvier than before. After that comes ㇏ whose final stroke becomes more angular than the previous.

這 這 這

Remark. Not all characters have only one unique representation, which is mainly due to the font. For instance, the character 這, which is composed of 辶 and 言, can be presented differently in multiple fonts as shown above. The character on the right, which is written in bold 楷書, clearly shows that it consists of ㇏.

Table 1.2.2c. Strokes Combination Pt. III 〈筆畫複合3〉		
筆畫	Names	Remarks
丷	豎挑	From top to bottom; examples are 印 and 衣.
┐	豎橫, 豎折	Perpendicular strokes; examples are 山 and 世.
ㄣ	豎曲	Curvier than the previous; examples are 區 and 四.
ㄥ	豎曲鉤	鉤-version of 豎曲; examples are 孔 and 已.
ㄣ	豎橫豎, 豎橫折	More turns; examples are 鼎 and 吳.
ㄣ	豎橫撇	More angular strokes; examples are 隼 and 攄.
ㄣ	豎橫撇鉤, 豎橫折鉤	鉤-version of 豎橫撇; examples are 隼 and 攄.
丩	豎鉤	From top to bottom; examples are 小 and 到.
丩	豎彎, 左豎彎	Written in two strokes; examples are 嘯 and 瀟.
丩	豎彎鉤	From top to bottom; one example is 颯.
ㄥ	撇挑	From top to bottom; examples are 去 and 鄉.
ㄥ	撇橫	Wider angle; examples are 互 and 牙.
ㄥ	撇點, 撇頓點	Rotated version of 撇橫; examples are 巡 and 鄰.
ㄥ	直撇點	Bottom stroke emphasized; examples are 女 and 如.
ㄥ	撇橫撇	Angular strokes; one example is 戾.
ㄥ	撇橫撇鉤	鉤-version of 撇橫撇; examples are 巧 and 亟.
ㄥ	撇鉤, 左彎鉤	From top to bottom; one example is 夂.
ㄥ	彎鉤	Rotated version of 撇鉤; examples are 狗 and 象.
ㄥ	扁捺鉤, 臥鉤	From left to right; examples are 心 and 必.
ㄥ	捺鉤	Rotated version of 扁捺鉤; examples are 戈 and 我.
ㄥ	撇橫撇曲鉤	Extended version of 橫撇曲鉤; one example is 𠂇.
ㄥ	撇圈點	α-like stroke; one example is 囟.

As we can see from these tables, most of these 筆畫 follow the character placed in front. For instance, the name of ㄥ starts with the character 撇, which suggests that the first stroke taken place is ㄥ. The one that comes after ㄥ is ㄥ and then, ㄥ and then, ㄥ. Since the stroke direction changes, we see that the first 筆畫 in compound 筆畫 from Table 1.2.2b and 1.2.2c follows the 筆畫 order from Table 1.2.2a.





With these information, we start learning the stroke order (in Chinese, 筆順; *bǐshùn*; ㄥ 一 ㄥ ㄥ ㄥ ㄥ ㄥ). While there are different standards and exceptions to write a character, the following is the general guidelines:

1. The general rule to write a character is to **start from top to bottom, and left to right**, which works for some characters. Some examples are 一, 二 and 三.
2. For some characters, if horizontal and vertical 筆畫 cross each other, **start with**

horizontal before vertical. Few examples are 十 and 卅. One of the exceptions is 一 since the vertical 筆畫 comes first before the horizontal.

3. The **strokes that span** come last. That is: vertical 筆畫 that pass through many other 筆畫 are written after those that they pass. Few examples are 聿 and 弗.
4. For diagonals, **start with right-to-left diagonals before left-to-right**. Few examples are 文 and 夕. One of the exceptions is 戈, which involves left-to-right diagonal before right-to-left.
5. For some symmetrical radicals or characters, **start with the center stroke before working outside**. Few examples are 水 and 永. Some exceptions are 兜 and 承, where the components on the left are written before the ones on the right.
6. For some characters that contain top-spanning radicals, like 口 and 犮, **work with the enclosing component before components inside**. Few examples are 國 and 同.
7. For some characters that contain bottom-spanning radicals, like 辶 and 廴, **start the bottom enclosing component last**. Some examples are 幽, 建 and 凶.
8. For some characters, **dots and minor components come last**. Some examples are 玉, 求 and 朮.

例 (Example)

Traditional	
Taiwan and Hong Kong	
Japan	
PRC (People's Republic of China)	

The chart include all ways to write the character 必, which is due to their standards (set by the governments in PRC, Hong Kong, Taiwan and Japan) prescribed to the standard character sets.

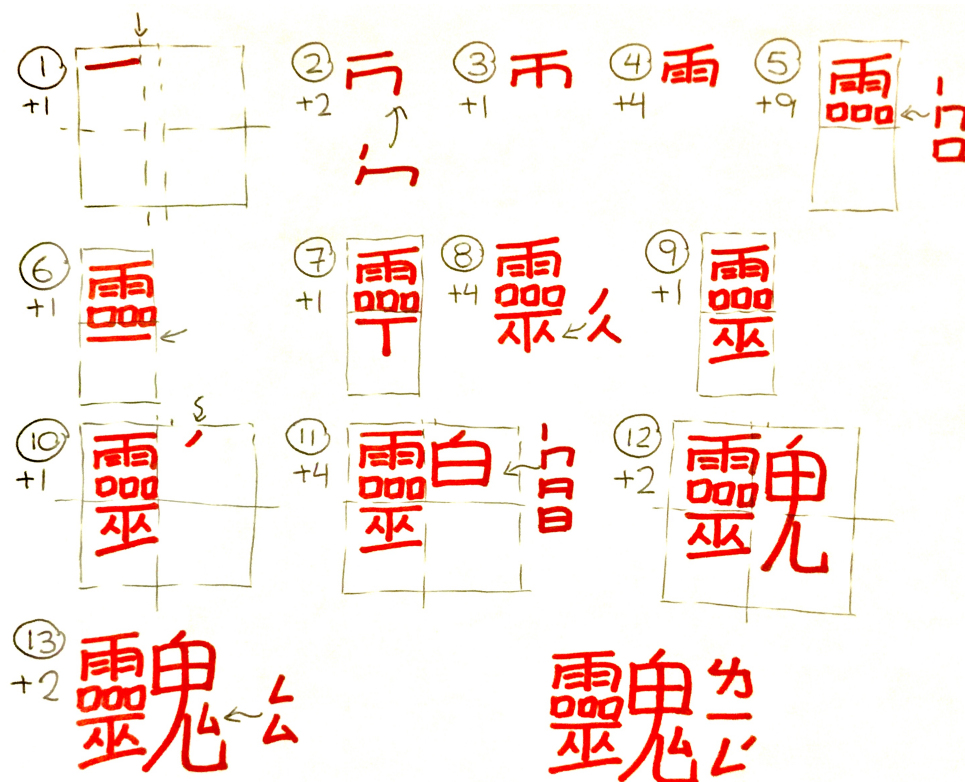
Since the strokes of 注音 are related to the strokes of 漢字, they all follow same 筆順. The special exception is the character 回, which is written in three strokes.

Table 1.2.2d. Zhuyin Stroke Order 〈注音筆順〉			
Strokes	Stroke Order	Strokes	Stroke Order
1	ㄅ ㄅ ㄅ	2	ㄆ ㄆ ㄆ
2	ㄇ ㄇ ㄇ	2	ㄇ ㄇ ㄇ
2	ㄉ ㄉ ㄉ	3	ㄊ ㄊ ㄊ
1	ㄋ ㄋ	2	ㄌ ㄌ ㄌ
2	ㄍ ㄍ ㄍ	2	ㄍ ㄍ ㄍ
2	ㄆ ㄆ ㄆ	2	ㄎ ㄎ ㄎ
1	ㄏ ㄏ	2	ㄏ ㄏ ㄏ
4	ㄘ ㄘ ㄘ ㄘ ㄘ	3	ㄣ ㄣ ㄣ
3	ㄣ ㄣ ㄣ	3	ㄣ ㄣ ㄣ
2	ㄣ ㄣ ㄣ	2	ㄣ ㄣ ㄣ
2	ㄣ ㄣ ㄣ	1	ㄣ ㄣ
2	ㄣ ㄣ ㄣ	2	ㄣ ㄣ ㄣ
3	ㄣ ㄣ ㄣ	2	ㄣ ㄣ ㄣ
2	ㄣ ㄣ ㄣ	3	ㄣ ㄣ ㄣ
3	ㄣ ㄣ ㄣ	1	ㄣ ㄣ
3	ㄣ ㄣ ㄣ	2	ㄣ ㄣ ㄣ
2	ㄣ ㄣ ㄣ	1	ㄣ ㄣ
3	ㄣ ㄣ ㄣ	1	ㄣ ㄣ
2	ㄣ ㄣ ㄣ		

Notice that 筆畫 count is determined by Table 1.2.2a, 1.2.2b and 1.2.2c, starting with the compound 筆畫. For instance, the character ㄅ contains three separate lines. However, since they are not considered compound, they cannot be isolated, which are altogether counted as one 筆畫. For some other characters, such as ㄇ and ㄘ, multiple 筆畫 are involved since the enclosing content cannot be entirely written in either clockwise or counter-clockwise motion.

Since majority of characters resemble close to the shape of a square, which contains four congruent sides and angles, we cannot dismiss the importance of managing written lines. While they are simply lines, they are treated as our powerful cues, which make practicing handwriting surprisingly simple. In theory, if at least one line is formed, it is definitely possible to manage lengths and positions for next 筆畫. No matter how the order starts, it's the length and the position that rise attention to three elements mentioned earlier in this subsubsection - **line**, **shape** and **space**.

例(Example)



In the first step, the horizontal 筆畫, which signals the relative position and width of the left-hand radical 靈. With that stroke, the components run down to 巫, which is below three 口. After that comes 鬼 also written from top to bottom. Under each numbered step displays the number of 筆畫 to write certain components. The rectangular boxes and axes approximate the anticipated sizes and positions of the radicals within the character.

Remark. Crossing 白 with 丿 is one way to write 鬼. In other standards, 鬼 is written with an extra 筆畫. That is: the top component 田 is written before bottom exponents. The extra 筆畫 comes from the center vertical line, intersecting the top and bottom lines.

Before you proceed to the exercises, read the entire information of Subsection 1.2. Then, try out the following exercises to the best of your ability without looking. The answers to those problems can be found, starting in Page 54.

問題 1 (Exercise 1)

Practice handwriting all 注音. Then, for each written character, determine whether it's 聲母, 介音 or 韻母.

問題 2 (Exercise 2)

For each of the following statements, determine whether it is true (正) or false (誤):

- (i) Each and every character must have only one unique representation as presented in all fonts.
- (ii) There are different standards in writing some characters.
- (iii) There are multiple script variants to write characters.
- (iv) After writing the character 永, we see that the correct number of 筆畫 is eight.

1.3 Dictionaries 〈字典〉

Thousands of years ago, people of 漢 dynasty developed various of dictionaries. Here are some types of dictionaries they came up with:

- **Semantically organized dictionaries:** The oldest dictionary known is *Ēryǎ* 爾雅, which classifies certain types of words in chapters. For instance, words that pertain to plants are listed in "Explaining Plants", whereas words that pertain to trees are listed in "Explaining Trees".
- **Graphically organized dictionaries:** All characters are ordered by their radicals. The famous example is the dictionary 說文解字 (*Shuōwén Jiězì*; 尸乂丩 乂ㄣノ ヨ一セゝ 𠂔ゝ) found during 100 CE¹². As its name suggests, it explains and analyzes each and every component of the character. It found 540 radicals, which is 部首 (*bùshǒu*; ㄣ乂ゝ 尸又ゝ) in Chinese. Another famous example is 康熙字典, which lists 214 部首. Nowadays, it became standard for searching 漢字.
- **Phonetically organized dictionaries:** All 漢字 are ordered by rimes and tones. The first dictionary found is 切韻 (*Qièyùn*; ㄣ一セゝ ㄣㄣゝ), which is "Cutting (Spelling) Rimes". Their content was later expanded in 廣韻 (*Guǎngyùn*; ㄣ乂尤ゝ ㄣㄣゝ) and 集韻 (*Jíyùn*; ヨ一ノ ㄣㄣゝ).
- **Function-organized dictionaries:** Each and every 漢字 is organized based on their functions. For instance, in one of the categories, 漢字 is organized by their grammar (i.e. verb, noun, adjectives).

¹²Common Era is the notation for BCE and CE. Some text uses AD, which is *Anno Domini*. In Latin, it stands for "in the year of the Lord", which makes reference to the time Christ was born (BC; "Before Christ").

Currently, there are plenty types of dictionaries developed. Some of the categories that they focus on include idioms, vernacular literature and loanwords. Even so, the main issue is that since all humans are different, it is important to keep in mind that not all users have the same amount of knowledge or interest in linguistics as others do. For instance, there are some who do not know how to use 部首 index while some others do not know how to use 注音 index. Therefore, some dictionaries include more indexes, such as 注音 index, and detailed information to cater those without any familiarity to the material.

例 (Example)

一 画	32 尢(兀允)	67 戈	(夂)	142 米	179 革
1 一	(兀)	68 比	102 业	143 聿(聿聿)	(頁)
2 丨	(丨)	(死)	103 目	144 艮	180 面
3 丿	33 寸	69 牙	104 田	145 艸(艸)	181 韭
4 丶	34 弋	70 瓦	105 皿	146 羽	182 骨
5 乙(乚)	(丿)	71 止	106 皿	147 系(彡)	183 香
二 画	35 口	72 支(攴)	(攴)	七 画	184 鬼
6 十	36 冂	73 日(日)	107 生	148 麦(麥)	185 食(饣)
7 厂(厂)	37 巾	(月)	108 矢	149 走	(風)
8 匚	38 山	74 贝(貝)	109 禾	150 赤	186 音
9 乚(乚)	39 彳	75 见(見)	110 白	(車)	187 首
(丨)	40 彳	76 牛	111 瓜	151 豆	(韋)
10 冂(冂)	(彳)	77 手(手)	112 鸟(鳥)	152 酉	(飛)
(冂)	41 夕	78 毛	113 犭	153 辰	十 画
(冂)	42 夕	79 气	114 立	154 豕	188 鬲
(冂)	(夕)	(女)	115 穴	(豕)	189 彭
11 八(八)	43 斗(斗)	80 长(長)	(斗)	155 鹵(鹵)	(馬)
12 人(人)	44 广	81 片	(圭)	(貝)	190 門
(人)	(广)	82 斤	(見)	(見)	191 高
(人)	45 冂(冂)	83 爪(爪)	116 疋(疋)	156 里	十一画
13 勹	(勹)	84 父	(氷)	157 足(足)	192 黄
(勹)	46 勹	(父)	118 夨	158 邑(邑)	(麥)
14 匕	(匕)	(父)	119 矛	159 身	(鹵)
15 儿	47 乚(乚)	85 月(月)	(母)	160 走(走)	(鳥)
16 几(几)	48 尸	86 氏	六 画	161 采	(魚)
17 勹	49 己	87 欠	120 耒	162 谷	193 麻
18 勹	50 弓	88 风(風)	121 耳	163 豸	194 鹿
(勹)	51 中(中)	89 爻	122 老(老)	164 龟(龜)	十二画
19 一	52 女	90 文	123 巨	165 角	195 鼎
(一)	53 飞(飛)	91 方	124 面(面)	166 言(言)	196 黑
20 口	54 小(小)	92 火(火)	125 而	167 辛	197 黍
21 冂(冂)	55 子	93 斗	126 页(頁)	八 画	十三画
(冂左)	56 马(馬)	(斗)	127 至	168 青	198 鼓
(冂右)	(马)	(斗)	128 虍(虎)	169 卓	(眼)
22 刀(刀)	(刀)	(斗)	129 虫	170 雨	199 鼠
23 力	57 彡	95 心(心)	130 肉	(長)	十四画
24 厶	58 彡	(心)	131 缶	171 齿(齒)	200 鼻
25 又	四 画	(心)	132 舌	172 非	(齊)
26 彡	59 王(王)	(心)	133 竹(竹)	(虎)	十五画
(彡)	60 无(无)	96 毋(毋)	134 白	173 龟(龜)	(齒)
三 画	61 韦(韋)	97 水(水)	135 自	174 隹	十六画
27 干	(韦)	五 画	136 血	175 阜(阜)	(龍)
28 工	62 木	(玉)	137 舟	176 金(金)	十七画
29 土(土)	63 支	98 示(示)	138 色	177 鱼(魚)	201 禽
(土)	64 大(大)	99 甘	139 齐(齊)	(門)	(龍)
30 井	65 彡(彡)	100 石	140 衣(衣)	178 隶	九 画
31 大	66 车(車)	101 龙(龍)	141 羊(羊)		

The characters shown above are all 部首 in 部首 index. They sort 漢字 as follows:

- (i) Find 部首 under which it is listed. The index orders them based on their number of 筆畫 in ascending order.
- (ii) Search for the character according to the number of 筆畫, which is determined by

$$\text{Number of 筆畫 of the Whole 漢字} - \text{Number of 筆畫 of 部首}$$

Here are some examples of searching characters by 部首:

- For some characters whose components are separable, they can be searched by their semantic components, which are also known as "dictionary components". 形聲字 (*xíngshēngzì*; 亠一厶 尸厶 冫丿), which are "phonosemantic characters", are some examples that can be found in 部首 index within short period of time. Since its literal translation suggests "sound" and "type", 形 gives away the clue. For instance, if we want to find 綴 in the list, look at 糸, which suggests the reading of 綴 follows the reading of 糸.
- Otherwise, the rules for finding 漢字 are irregular. For instance, 正 whose components are 一 and 止 belong to categories of 一 and 止. However, it does not belong to the category of 丨.

Some dictionaries include 注音 index, which is used to assist those who cannot search for a particular character via radicals only. That index sorts characters according to MPS (Mandarin Phonetic Symbol) Index:

1. Sort the characters according to their 聲母, 韻母, 介音 and then 聲調 (increasing numeral order).
2. Then, for characters containing exactly the same reading, sort in the order of radicals.

To see how it works, consider the table below, which is a sketch of registering 注音 readings in dictionaries:

Table 1.3. Zhuyin Combinations 〈注音組合〉				
Type	聲母	介音	韻母	Examples
1	✓			All characters in 聲母.
2	✓		✓	ㄅㄛ, ㄆㄛ, ㄇㄛ
3	✓	✓		ㄅㄟ, ㄆㄟ, ㄇㄟ, ㄅㄛ
4	✓	✓	✓	ㄅㄟㄣ, ㄆㄟㄣ, ㄇㄟㄣ, ㄅㄟㄣ
5			✓	All characters in 韻母.
6		✓		All characters in 介音.
7		✓	✓	ㄅㄟㄣ, ㄆㄟㄣ, ㄇㄟㄣ

where 聲調 is not taken into consideration. Since the type numbers are all in ascending order, we can follow them to order the readings. However, since there are more than one possible selection in each category, the index instead chooses the next character in the target category. For instance, if all readings containing ㄅ are looked through, then we move on to ㄆ. Therefore, the character register and sorting run as follows:

1. Choose the first character from 聲母, which is ㄅ. As shown in Table 3, that belongs to Type 1.
2. To check, find at least one character, containing ㄅ and 聲調. If at least one character of that reading exists, add to the list. Otherwise, skip.
3. Proceed to Type 2, which includes 韻母. Since we want each character in 韻母 to be checked, repeat Step 2 for Type 2 combinations while keeping ㄅ and running through 韻母 in order.
4. Proceed to Type 3, which includes 介音. Since Type 3 combinations miss 韻母, sorting them in the order of 介音 does not work. So choose the first character from 介音, which is ㄟ. Then, repeat Step 2 while keeping ㄅ. Distinct ㄅㄟ-readings are filtered.
5. Proceed to Type 4, which includes both 介音 and 韻母. Repeat Step 3 while keeping ㄅㄟ altogether.
6. Repeat Step 4-5 for the remaining 介音 not used.
7. Since the readings containing the same 聲母 are all checked, proceed to the next 聲母, which corresponds to Type 1. Repeat the previous steps for filtering ㄆ-readings.
8. Repeat Step 7 for the remaining 聲母.
9. Now that all readings of Type 1, 2, 3 and 4 are checked, proceed to Type 5. Since the final part is like the beginning, repeat 3-6 while only looking at 介音, 韻母 and 聲調.
10. Characters of the same readings are finally sorted by radicals and number of strokes.

Those with prior experience of Mandarin Chinese would think that checking nonexistent readings are not necessary. For instance, checking ㄅ is not necessary since it does not contain a minimal vowel (Section 2). While this is correct, there are actually reasons of testing Type 1 combinations:

1. **Simplicity:** That eliminates unnecessary parameters during the sorting. As long as the structure of Mandarin Chinese (including phonology rules) are not adjusted, the results will always be the same, even if we know the readings do not exist.
2. **Completeness:** Despite the readings that do not exist in 注音 table, there are some "nonstandard" readings that do not exist in the table, but exist in Mandarin. For instance, ㄅㄟㄣ does not exist in the table. However, the existing character with that reading is 掇.

例 (Example)

[illegible]

- 1288 -

注音 index from *A New Practical Chinese-English Dictionary* published in 1972.

The following image is an example of how characters are arranged in 注音 index chart. As shown, some characters, starting with ㄉ, are listed. Since the character number (labeled on the right of the character) is determined by its radical and the number of strokes, these numbers are entirely in ascending order.

Also notice that after ㄅㄨㄣˇ come ㄅㄨ characters, containing 介音 (from Type 2 to Type 3). The reading that comes after ㄅㄨㄣˇ is ㄅㄨㄣˇ (from Type 3 to Type 4) since they did not find any characters of readings between ㄅㄨㄣˇ and ㄅㄨㄣˇ. We see that if both distinct readings have those in common, the one that does not contain 韻母 goes first. After ㄅㄨㄣˇ comes ㄅㄨㄣˇ since ㄣ comes before ㄨ in 介音 (Table 1). The index continues to search and add any known ㄅㄨㄣˇ-reading before proceeding to ㄅㄨㄣ and then, ㄅ.

Before you proceed to the exercises, read Subsection 1.3. Then, try out the following exercises to the best of your ability without looking. The answers to those problems can be found,

starting in Page 55.

問題 1 (Exercise 1)

Sort the following characters in the correct order:

ㄚ, ㄣ, ㄘ, ㄨ, ㄛ, ㄜ, ㄝ, ㄞ, ㄟ, ㄠ, ㄡ, ㄢ, ㄣ, ㄤ, ㄥ, ㄦ, ㄨ, ㄩ, ㄣ, ㄤ, ㄥ

問題 2 (Exercise 2)

True (正) or false (誤): Each and every 漢字 listed must occur once in 注音 index.

問題 3 (Exercise 3)

Suppose we want to sort an arbitrary list of ten thousands of characters taken from 康熙字典. We know that characters can be sorted by 注音 readings and then, by radicals and strokes. But instead we consider the following method:

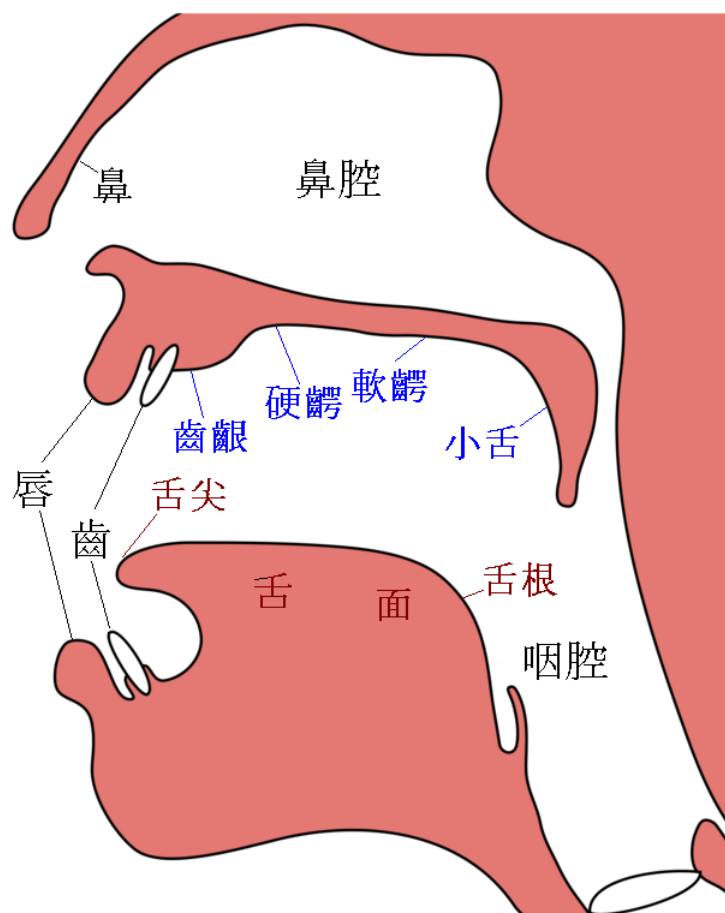
1. Sort all characters by radicals and strokes.
2. Run through the whole steps of listing characters by their 注音 readings in order, starting with characters, containing 一 stroke.

Will that method give the same result as the one we learned? If so, why? Otherwise, give a counterexample.

Fun Remark. If we consider the positions of 注音 characters only, there $2^3 - 1 = 7$ total types of combinations, excluding 聲調. If we then play around with all 注音 characters and 聲調 we learned, there are $(22 \times 4 \times 14 \times 6) - 1 = 7391$ total possible combinations to play with!

2 Consonants 〈聲母〉

Recall that 聲母 is categorized in the order of place of articulation. In linguistics, a place of articulation refers to a point or a region of contact, where at least one moving part of the mouth obstructs the air passed through the vocal tract. Without going further, we take some steps back and then, ask ourselves: How does the term "articulation" play the significant role in listing 聲母? To answer this, consider the following diagram:



where

- The labels in blue denote the parts around the palate¹³.
- The labels in crimson red denote the parts around the tongue.
- The labels in black denote parts other than the palate or the tongue.

When consonants are pronounced, at least one point of articulation within the mouth occurs. The following are the most important terms that help simplify technical consonant vocabularies used in linguistics:

1. 唇/脣 (*chún*; ㄔㄨㄣˊ) is "lips".

¹³The palate is the roof of the mouth.

2. 齒 (*chǐ*; 彳 丩) is "teeth".
3. 齒齦 (*chǐyín*; 彳 丩 一 ㄣ 丩) is "gum", the soft tissue around the teeth.
4. 硬齶 (*yìng'è*; 一 ㄣ 丩 ㄣ 丩) is "hard palate", which takes place on the roof of the mouth.
5. 軟齶 (*ruǎn'è*; ㄣ ㄣ ㄣ 丩 ㄣ 丩) is "soft palate", which takes place behind 硬齶.
6. 舌面 (*shémiàn*; 尸 ㄣ 丩 ㄣ ㄣ 丩) is literally the surface of the tongue.
7. 舌根 (*shégēn*; 尸 ㄣ 丩 ㄣ ㄣ 丩) is literally "the root/back of the tongue".

With Table 1 in hand, it follows that the order of the first three categories are as follows:

1. ㄣ ㄣ ㄣ ㄣ are classified in 唇音 (labial; literally "lip sound"). Their pronunciations are produced after the lips (唇) open.
2. ㄣ ㄣ ㄣ ㄣ are classified in 齒齦音 (alveolar; literally "gum sound"), which is also known as 舌尖中音. Their pronunciations are produced while the tip of the tongue (舌尖) touches the inner side of the gum (齒齦).
3. ㄣ ㄣ ㄣ are classified in 軟齶音 (velar; literally "soft palate sound"), which is also known as 舌根音. Their pronunciations are produced while the back of the tongue (舌根) touches the soft palate (軟齶).

Unlike these consonants we discussed, which suggest they can be pronounced like their English counterparts, the consonants in the last three categories focus primarily on how the tongue articulates. For clarity, the character 舌 is used:

1. In standard linguistics, ㄣ ㄣ ㄣ are classified in 硬齶音 (palatal; literally "hard palate sound"). They also belong to 舌面前音, which is also known as 舌冠音¹⁴ (coronal; literally "tongue crown sound"). Even though 硬齶 is positioned between 軟齶 and 齒齦, their pronunciations are produced while the front part of the tongue extended toward the hard palate (硬齶). Touching the hard palate violates the lexical order of consonants since the articulations of ㄣ ㄣ ㄣ are known. So to avoid that complication, I chose 舌冠音, which is consistent with the articulation.
2. ㄣ ㄣ ㄣ ㄣ are classified in 捲舌音 (retroflex; literally "curl/roll tongue sound"), which is also known as 翹舌音 (literally "raise tongue sound"). As these literal translation suggests, the pronunciations are pronounced while the tongue is raised (but not touching the palate) and rolled at the same time.
3. In standard linguistics, ㄣ ㄣ ㄣ are classified in 齒齒齦音 (denti-alveolar; literally "teeth gum sounds"), which suggests their pronunciations are pronounced while the tongue flattens evenly against the teeth and the gum. However, the term 平舌音 (blade-alveolar; literally "flat tongue sound") is chosen to differentiate the place of articulation.

¹⁴舌冠音 (*shéguān*; 尸 ㄣ 丩 ㄣ ㄣ 丩) is derived from the front flexible part of the tongue.

In the order of consonants, the system can finally be established:

Table 2. Consonant Phonology 〈聲母音韻〉			
注音	Pīnyīn	IPA	Method of Articulation
ㄅ	b	p	Similar to an English b (front side of the lips).
ㄆ	p	p ^h	Aspirated "b"; Similar to a strong letter "p" as in "pit".
ㄇ	m	m	Similar to an English m.
ㄈ	f	f	Similar to an English f.
ㄉ	d	t	Similar to an English d (close to the teeth).
ㄊ	t	t ^h	Aspirated "d"; Similar to a strong letter "t" as in "top".
ㄋ	n	n	Similar to an English n.
ㄌ	l	l	Similar to an English l.
ㄍ	g	k	Similar to a sharp-sounding g (touching soft palate).
ㄎ	k	k ^h	Aspirated "k"; similar to a strong letter "k" as in "kill".
ㄏ	h	x	Tongue recedes farthest from mouth.
ㄐ	j	tɕ	Front part of tongue rising.
ㄑ	q	tɕ ^h	Aspirated "j"; from "j", tongue recedes slightly backward ¹⁵ .
ㄒ	x	ɕ	From "q", tongue recedes backward with softened English "sh".
ㄗ	zhi, zh-	tʂ	Tongue rolls upward and raises with "j" ¹⁶ -like pronunciation.
ㄘ	chi, ch-	tʂ ^h	Aspirated "zh"; similar to ch in English "chat".
ㄙ	shi, sh-	ʃ	Like an English sh; from "ch", tongue recedes back.
ㄖ	ri, r-	ɹ~ʐ	Like an English initial r; from "sh", tongue recedes back more.
ㄗ	zi, z-	ts	Tongue flattens with "zh" ¹⁷ -like pronunciation.
ㄘ	ci, c-	ts ^h	Aspirated "z"; tongue recedes back ¹⁸ .
ㄙ	si, s-	s	From "c", tongue recedes back more.

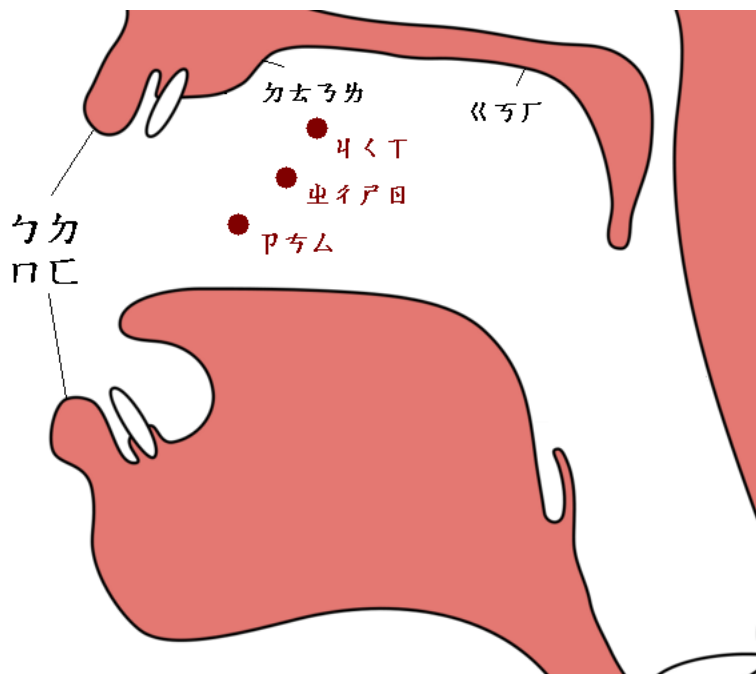
where the approximate points of articulation are as shown in the diagram below:

¹⁵The point for the tongue to recede backward is for consonant contrast. With the tongue positioned close to ㄐ mark, the pronunciation would sound closer to ㄐ than to ㄑ since that would imply the soft pronunciation of ㄑ.

¹⁶Since ㄐ and ㄗ are both unaspirated affricates, their pronunciations can be related.

¹⁷By the similar reason, ㄗ and ㄗ are both unaspirated affricates. Therefore, their pronunciations can be related.

¹⁸The reason for tongue positioned toward the back of a vocal tract has to do with consonant distinction. Without that, the pronunciation would be closer to ㄗ than to ㄘ. It is the teeth, the lips and the tongue that obstruct the air flow.



As we discovered, the order of consonants starts from the front of the lips to the palate and then, below. The black points denote the place of articulations, involving the point of contact. The red points approximate the position within the mouth, where the particular part of the tongue meets during the beginning of articulation. Once the tongue reaches one of those points, it shifts toward the back of the vocal tract.

Note that the characters ㄅ, ㄆ, ㄇ, ㄌ, ㄋ, ㄔ, ㄕ and ㄗ contain more than one possible readings. When the character is only used - whether or not the tonal mark is used - it ends with a vowel "i", which is its minimal vowel ㄞ (not used in transcription). Those can be used to represent a character. Otherwise, if either 介音 or 韻母 takes place, then the minimal vowel is neglected in 注音 combinations. Examples are provided in Section 4.

例 (Example)

The following are some of the characters that use either of those 聲母.

之_ㄗ 吃_ㄔ 失_ㄕ 日_ㄖ、資_ㄗ 毗_ㄗ 司_ㄙ

where the *pīnyīn* readings are respectively *zhī*, *chī*, *shī*, *rì*, *zī*, *cī* and *sī*. Notice that sounds of 聲母 are similar. To prevent ㄗ, ㄔ and ㄕ from merging respectively into ㄗ, ㄔ and ㄕ, differentiate their tongue positions, so that ㄗ, ㄔ and ㄕ do not fall in 翹舌音 case. That follows the literal translations of 翹舌 and 平舌 that we discussed.

Before you proceed to the exercises, read Section 2 entirely. Then, try out the following exercises to the best of your ability without looking. The answers to those problems can be

found, starting in Page 55.

問題 1 (Exercise 1)

Practice the readings in the order 聲母 are in. Then, repeat for the reversed order.

問題 2 (Exercise 2)

True (正) or False (誤): Each and every 聲母 category has a unique Chinese name.

問題 3 (Exercise 3)

ㄅ ㄆ ㄇ and ㄅ ㄆ ㄇ are sets that primary school students in Taiwan have trouble differentiating. One possible solution for this is:

1. Read ㄅ ㄆ ㄇ each with the short vowel ㄟ (which sounds like "e" as in "see") at the end. That is: read ㄅㄟ, ㄆㄟ and ㄇㄟ at that order.
2. Sing 啦 (*la*; ㄌㄚ) thrice¹⁹.
3. Repeat Step 1 for ㄅ ㄆ ㄇ.

For the following parts of the exercise, consider only the essential parts of the mouth. This exercise assesses how strategic your learning skills are.

- (a) Explain the reason why reading out the extended ㄟ would help.
- (b) Will the method also work if ㄅ, ㄆ and ㄇ are read first before ㄅ, ㄆ and ㄇ? If so, prove that starting from Step 1, the difference can be realized. Otherwise, give a counterexample that shows the method is not effective.
- (c) Suppose you are in a situation, where you instruct your classmate to try the solution. Since he is interested in shortcuts, he thinks that Step 2 is not important, so he plans to try out Step 1 and 3 only. Would that method be more effective than the previous? If so, how? Otherwise, disprove it.

¹⁹The term thrice means "three times"

3 Medials and Rhymes 〈介音與韻母〉

Mandarin dialects, including PRC's 普通話 (*Pǔtōnghuà*; ㄆㄨˇ ㄊㄨㄥˋ ㄏㄨㄚˋ), have different variations of phonology. From Section 2, when reading 虫, ㄟ, 尸, 日, ㄖ, ㄗ or ㄌ, the backed sound is involved, which serves as an example of acrolectal²⁰ Taiwanese Mandarin 國語 (*Guóyǔ*; ㄍㄨㄛˊ ㄩˇ). The noticeable difference between these dialects is that acrolectal 國語 is influenced by the phonology of Taiwanese Minnan²¹ 閩南語 (*mǐnnányǔ*; ㄇㄧㄣˊ ㄢㄢˊ ㄩˇ). For instance, consider the following readings of 翁:

普通話: /wəŋ/
國語: /wʊŋ/, wɤŋ
臺灣閩南語: /aŋ/, /ɔŋ/

where

- The *pīnyīn* reading for that character is *wēng*. However, the way these IPA Mandarin readings are transcribed in two different dialects is different. For 普通話 case, the reading is somewhere between ㄨㄥˋ and ㄨㄥˊ because of its phonology. On the other hand, for 國語 case, the reading is ㄨㄥˊ.
- The POJ reading (used to transcribe 閩南語) is either *ang* (vernacular) or *ong* (literary). Approximate 注音 readings are respectively about ㄤ and ㄨㄥ.

The reading in 國語 is similar to the reading in 臺灣閩南語 since vowels sound close to each other. Without noting those distinctions, 翁 would sound more like 文 whose IPA reading is /wən/. That would render 國語 less standard than the one including some exceptions on the reading of ㄨ. Therefore, to avoid any possibility of mishearing one vowel as another, the standards of pronunciations were established.

Out of all characters in Table 1, 介音 and 韻母 are the most complex components. While the pronunciations of 聲母 are regular, the pronunciations of 介音 and 韻母 are not. So to simplify the learning process, here is the outline for this section:

1. Treat 介音 and basic 韻母 as vowels. We will discuss their usages later.
2. Apply those to compound 韻母, which helps define their readings.
3. Enumerate all possible combinations, involving 介音 and 韻母. We consider them in acrolectal 國語 case. More info is explained in Subsection 3.2

²⁰An acrolect is the variety of speech that is considered the standard form in many occasions, whereas a basilect is the variety of speech that diverges from the standard form. The linguist of African American English, William Stewart, coined those terms in 1965.

²¹The term "Minnan" is the transliteration of 閩南, which literally means "Southern Min". Even though the term "Hokkien", which comes from 福建話, is used, Taiwan does not use that for political reasons; either 臺語, 臺灣語 (derived from Japanese 台灣語) or 閩南語 is used.

3.1 Vowels 〈元音〉

Recall that from Subsection 1.1, we see that characters with individual vowels are 一, ㄨ, ㄩ, ㄣ, ㄤ, ㄥ and ㄜ. As we discovered earlier, their pronunciations behave distinctly when combined with some consonants. That suggests at least one of these vowels contains multiple allophones²². The list of all possible allophones are as follows:

Table 3.1a. Individual Vowels 〈單元音〉				
注音	Pīnyīn	IPA	Category	Method of Articulation
一	i	i	介音	Similar to e in English "see".
ㄨ	u	u		Similar to o in English "do".
	o	ʊ		Between IPA o and u.
ㄩ	ü	y		Similar to German ü ²³ , French u or ㄨ一.
ㄣ	a	ä	韻母	Similar to a in English "bra".
ㄤ	o	ɔ		Similar to a in American English "awe".
ㄥ	e	ɜ		Similar to vowel sound in English "done".
ㄜ	e/ê	ɛ		Similar to e in English "sleigh".

where

- ㄣ, ㄤ, ㄥ and ㄜ are automatically in 單韻母 (*dānyùnmǔ*; ㄉㄢ ㄩㄣ ㄇㄨˇ), which literally means literally "single rhyme".
- The standard individual reading of ㄨ is /u/. Its vowel can change based on the initial.
- The reading of "e" is irregular.

We can now apply the concepts of pronouncing individual vowels to work out 複韻母 (*fùyùnmǔ*; ㄈㄨˋ ㄩㄣ ㄇㄨˇ), which literally means "complex rhymes":

Table 3.1b. Complex Rhymes (複韻母)			
注音	Pīnyīn	IPA	Method of Articulation
ㄞ	ai	aɪ	Implies ㄣ一 with open front ㄣ.
ㄟ	ei	eɪ	Implies ㄜ一 with close-mid ㄜ.
ㄠ ²⁴	ao	ɑʊ	Implies ㄣㄨ with open back ㄣ and inflected ㄨ.
ㄡ	ou	oʊ	Implies ㄤㄨ with inflected ㄨ.

where

²²In linguistics, an allophone is a particular spoken sound that represents a single phoneme. A Chinese example is the aspirated p (or ㄆ) in the character 破, which reads ㄆㄛˋ.

²³The vowel ü does not exist in English.

²⁴Some articles show that the IPA reading of ㄠ is /ao/, which misses the important point that /a/ becomes /ɑ/ because of /ʊ/.

- For ㄣ, ㄩ follows ㄟ, but altogether pronounced with tongue brought forward. An English example is the greeting interjection "hi" whose IPA reading is /hai/.
- For ㄟ, ㄜ follows ㄟ, but with close-mid vowel tongue articulation. An English example is the word "hate" whose IPA reading is /hert/.
- For ㄜ, ㄩ follows ㄨ. ㄜ sounds similar to "ow" in "cow" whose IPA reading is /kau/.

Next, we look at 鼻韻母 (*bíyùnmǔ*; ㄣ ㄨ ㄣ ㄨ ㄣ ㄨ), which are far more complex than the previous. Since it is literally "nasal rhymes", the nasal consonants must occur at the end. So consider the 注音 character ㄣ and the Chinese character ㄣ. Since the characters are positioned at the end, not on the front, include the vertical stroke for each of them, so that we have ㄣ and ㄣ. Looking at the characters one-by-one, we have that

1. ㄣ has the same reading as its counterpart ㄣ.
2. ㄣ has few possible readings:
 - (a) *wù*, which corresponds to ㄨ ㄣ;
 - (b) *wū*, which corresponds to ㄨ; and
 - (c) *wāng* (with -ng appended), which corresponds to ㄨ ㄣ as a variant form of ㄣ.

Since we are interested in nasal finals, then the reading of ㄣ corresponds to *-ng* (IPA: /ŋ/), which simply comes from the ending part of ㄣ. The point of using ㄣ is for distinction.

Therefore, we have

Table 3.1c. Nasal Rhymes (鼻韻母)			
注音	Pīnyīn	IPA	Method of Articulation
ㄣ	an	än	Implies ㄣ ㄣ.
		en	Implies ㄜ ㄣ.
ㄣ	en	ən	Implies ㄜ ㄣ with schwa.
ㄣ	ang	ɑŋ	Implies ㄣ ㄣ with open back ㄣ.
ㄣ ²⁵	eng	ɤŋ	Implies ㄜ ㄣ.
		ʊŋ	Implies ㄨ ㄣ.

where

- For ㄣ, the standard reading is /an/. It reads /en/ for some characters.
- For ㄣ (similar to "un" in English "sun", but with "e" sounding closer to "a" in "about"), the IPA reading /ɤ/ becomes /ə/ from ㄜ.

²⁵Some articles point out that ㄣ has a reading /ən/, which emphasizes a reduced vowel. However, Mandarin Chinese has two distinct ways of reading ㄣ, which is inconsistent with the conclusions the articles came up with. More examples are given in Subsection 3.2 and Section 4.

- For ㄣ (similar to "ong" in "King Kong", but with /ɑ/ articulation), the reading of ㄩ changes.
- For ㄥ (similar to "ung" in English "fungus", but with the tongue positioned backward), /ʊŋ/ is currently the standard reading in 國語 case. Its reading changes based on the initial.

Last but not least, 韻母 has 儿, the final character in the list. Since it was derived from 兒, its reading is *er* (IPA: /ɤɿ/). It is the character that is expressed alone in any of 注音 combinations.

例 (Example)

鯽_儿 餌_儿 貳_儿

The characters above contain 儿. Those are three readings commonly taught in Mandarin Chinese.

3.2 Medial and Rhyme Combinations 〈元音組合〉

Recall that from Subsection 1.1, one of the patterns for combining 注音 characters is:

$$\text{語音} = \text{聲母} + \text{介音} + \text{韻母} + \text{聲調}$$

For this subsection, since we are interested in understanding the combinations of 介音 and 韻母, look at

$$\text{語音} = \text{介音} + \text{韻母}$$

To start, consider 韻母, which are

ㄚ, ㄛ, ㄜ, ㄝ, ㄝ, ㄞ, ㄟ, ㄠ, ㄡ, ㄣ, ㄥ, ㄥ

Since it is possible that 注音 combinations do not consist of 韻母, include \emptyset , so that we have

\emptyset , ㄚ, ㄛ, ㄜ, ㄝ, ㄝ, ㄞ, ㄟ, ㄠ, ㄡ, ㄣ, ㄥ

By convention, those are classified in ㄚ-final group. By the similar reason, we can also extend 介音 to

\emptyset , ㄟ, ㄠ, ㄡ

So that if we combine 介音 with 韻母, we have found three other groups: 一-final, ㄨ-final and ㄩ-final. Since there are 14 characters in ㄩ-final group, which can be used to combine with one of the characters above, we have $14 \times 4 = 56$ combinations in all:

ㄩ-group : ㄨ, ㄩ, ㄣ, ㄤ, ㄥ, ㄨ, ㄩ, ㄣ, ㄤ, ㄥ, ㄨ, ㄩ, ㄣ, ㄤ, ㄥ

一-group : 一, 一ㄩ, 一ㄣ, 一ㄤ, 一ㄥ, 一ㄨ, 一ㄩ, 一ㄣ, 一ㄤ, 一ㄥ, 一ㄨ, 一ㄩ, 一ㄣ, 一ㄤ, 一ㄥ

ㄨ-group : ㄨ, ㄨㄩ, ㄨㄣ, ㄨㄤ, ㄨㄥ, ㄨㄨ, ㄨㄩ, ㄨㄣ, ㄨㄤ, ㄨㄥ, ㄨㄨ, ㄨㄩ, ㄨㄣ, ㄨㄤ, ㄨㄥ

ㄩ-group : ㄩ, ㄩㄩ, ㄩㄣ, ㄩㄤ, ㄩㄥ, ㄩㄩ, ㄩㄩ, ㄩㄣ, ㄩㄤ, ㄩㄥ, ㄩㄩ, ㄩㄩ, ㄩㄣ, ㄩㄤ, ㄩㄥ

where if no 聲母 takes place, then

- 一 has the *pīnyīn* reading "yi-" (IPA: /j/, /i/), following the reading of its vowel "i" (IPA: /i/).
- ㄨ has the *pīnyīn* reading "wu-" (IPA: /w/, /u/), following the reading of its vowel "u" (IPA: /u/).
- ㄩ has the *pīnyīn* reading "yu-" (IPA: /y/, /y/), following the reading of its vowel "ü" (IPA: /y/).

So the method of practice reading those combinations is as follows:

1. Do not look at 聲調. Read each of the characters one-by-one, starting from the left.
2. Once those are read, read altogether with 聲調.

Since the individual vowels of 介音 are regular, the following method also works when all characters in the final are read altogether:

1. Do not look at 聲調. Read what is presented.
2. Then, read altogether with 聲調.

例 (Examples)

挨 癌 矮 愛
哀 皑 婬 礙

The following are some characters that contain ㄨ-readings. Those with only one 注音 character can be read once. So ㄨ is read first before the one with 聲調.

Unlike some languages, Chinese is heavily syllable-timed, which follows the concept of "isochrony". In linguistics, the term "isochrony" divides the time length of rhythmic speech into approximately even intervals. Since there are vocabularies that can be composed of

more than one 漢字²⁶, we cannot neglect that making a reasonable number of short pauses is essential. Running through one long string of concatenated words without any pause often confuses listeners to think of that as one long word instead of one expression, consisting of separate words. So for a clear communication, pauses are usually made between words, so that each syllable is said at a right time.

例 (Examples)

陰_ㄣ 影_{ㄣˇ} 孕_ㄣ、 育_ㄣ、

Notice that these characters each contain 韻母. The steps to read them are to start with 介音 first before 韻母. Then, read them altogether with 聲調. The method for each character is executed as follows:

一 + ㄣ → ㄣ	ㄣ + ㄣ → ㄣ
一 + ㄣ → ㄣˇ	ㄣ → ㄣ、
陰影 → ㄣ ㄣˇ	孕育 → ㄣ、 ㄣ、

An alternate method is to read each of compound readings completely before employing 聲調.

Also note that 陰影 and 孕育 exist in Mandarin Chinese. This shows that they are distinct words. In this case, when reading 陰影孕育 altogether, a pause should be made between 陰影 and 孕育. If a pause is made elsewhere, listeners would assume that one particular 漢字 represents a word.

Most importantly, since the combinations are entirely based on how those vowels articulate, there are some that do not work in Mandarin Chinese. Here are the exceptions that all 介音 have in common:

- Following Subsection 3.1, since ㄣ is typically expressed alone, 一ㄣ, ㄣㄣ and ㄣㄣ do not exist in Mandarin Chinese.
- Since ㄣ is typically combined with 聲母, but not with 介音 (as that shifts the position of the tongue unevenly, creating less harmonious vowel sound), 一ㄣ, ㄣㄣ and ㄣㄣ do not exist.

Here are other exceptions:

- For 一-final group, 一ㄣ does not exist by the similar reason that 一ㄣ does not exist.
- For ㄣ-final group, ㄣㄣ and ㄣㄣ do not exist since they both constitute weak syllables, which can sound similar to ㄣㄣ.

²⁶In Chinese, we call those 複合詞 (*fùhécí*; ㄣㄣ、ㄣㄣ、ㄣㄣ), which is literally "complex words" "Compound words" is also 合成詞 (*héchéngcí*; ㄣㄣ、ㄣㄣ、ㄣㄣ)

- For ㄩ-final group, no 韻母 can be a vowel except ㄝ.
- For ㄩ-final group, any nasal 韻母 works except ㄤ since its vowel, which is "a" (but read with /ɑ/), cannot be dropped like ㄣ and ㄥ.

From ㄩ-case,

Table 3.2a. ㄩ-Final Group (「ㄩ」的組合)			
注音	Pīnyīn	IPA	Remarks
∅			Applicable only to ㄅ, ㄆ, ㄇ, ㄏ, ㄏ, ㄏ and ㄥ.
ㄩ	a	ä	Similar to a in English "bra".
ㄛ	o	ɔ	Similar to a in American English "awe".
ㄝ	e	ɛ	Similar to vowel sound in English "done".
ㄟ	e/ê	ɛ	Similar to e in English "sleigh".
ㄟ	ai	ai̯	Implies ㄩ一 with open front ㄩ.
ㄟ	ei	ei̯	Implies ㄟ一 with close-mid ㄟ.
ㄟ	ao	ɑu	Implies ㄩㄨ with open back ㄩ and inflected ㄨ.
ㄟ	ou	ou̯	Implies ㄟㄨ with inflected ㄨ.
ㄟ	an	än	Implies ㄩㄢ.
ㄟ	en	ən	Implies ㄟㄢ with schwa.
ㄟ	ang	ɑŋ	Implies ㄩㄥ with open back ㄩ.
ㄟ	eng	ɛŋ	Implies ㄟㄥ.
ㄟ	er	ɛɹ	Unique 韻母 with rhotic r.

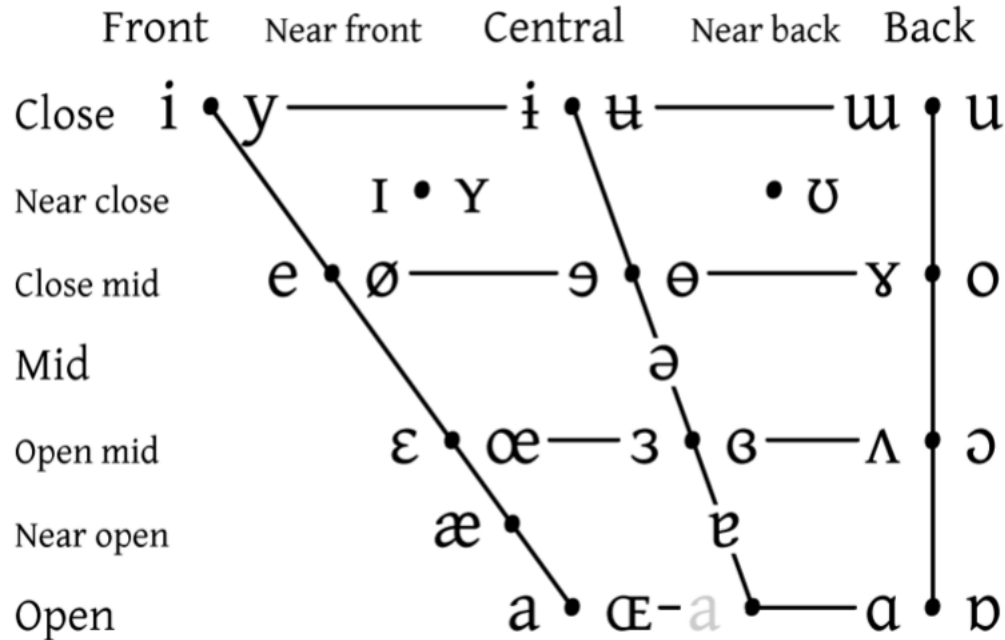
where all of the readings do not change, we have

Table 3.2b. 一-Final Group (「一」的組合)			
注音	Pīnyīn	IPA	Remarks
一	yi	i	As an individual character, the pīnyīn reading "y" is included.
一ㄩ	ya	jä	The reading is regular.
一ㄛ	yo	jɔ	The reading is regular.
一ㄝ	ye	iɛ	The reading is regular.
一ㄟ	yai	jai̯	The reading is regular.
一ㄟ	yao	jɑu	The reading is regular.
一ㄟ	you	jou̯	The reading is regular.
一ㄟ	yan	jɛn	As 鼻韻母, the reading of ㄟ is inflected by 一.
一ㄟ	yin	in	The vowel of ㄟ is dropped.
一ㄟ	yang	jɑŋ	The reading is regular.
一ㄟ	ying	iŋ	The vowel of ㄟ is dropped.

Table 3.2c. ㄨ-Final Group (「ㄨ」的組合)			
注音	Pīnyīn	IPA	Remarks
ㄨ	wu	u	As an individual character, the pīnyīn reading "w" is included.
ㄨㄚ	wa	wä	The reading is regular.
ㄨㄛ	wo	wɔ	The reading is regular.
ㄨㄞ	wai	wai̯	The reading is regular.
ㄨㄟ	wei	wei̯	The reading is regular.
ㄨㄢ	wan	wän	The reading is regular.
ㄨㄣ	wen	wən	The reading is regular.
ㄨㄥ	wang	wɑŋ	The reading is regular.
ㄨㄥ	weng	wɤŋ	With standard ㄜ.
Table 3.2d. ㄩ-Final Group (「ㄩ」的組合)			
注音	Pīnyīn	IPA	Remarks
ㄩ	yu/yü	y	As an individual character, the pīnyīn reading "y" is included.
ㄩㄝ	yue	ɥɛ	The reading is regular.
ㄩㄢ	yuan	ɥɛn	As 鼻韻母, the reading of ㄢ is inflected by ㄩ.
ㄩㄣ	yun	yn	The vowel of ㄣ is dropped.
ㄩㄥ	yong	jyŋ	The vowels of ㄩ and ㄥ are fused together, so that the pīnyīn reading "y" is emphasized.

From these tables, the readings that work differently from others are combinations, containing 鼻韻母. While reading their bases as shown may work (i.e. ㄩㄥ treated as /jyŋ/), there are significant purposes of vowel changes, concerning the nasalization and initials. In truth, learning these characters is not simply about memorizing them as shown, but about figuring out *why they behave differently* from Chinese natives' point of view. To start, we consider the vowels in ㄩ, ㄨ and ㄩ:

- ㄩ and ㄩ are classified as close front vowels. This suggests that (1) the tongue is positioned close to the roof of the mouth, but at the same time (2) positioned relatively in front of the mouth.
- ㄨ is classified as the close back vowel. This suggests that (1) the tongue is positioned close to the roof of the mouth, but at the same time (2) positioned relatively back of the mouth.



Vowels at right & left of bullets are rounded & unrounded.

For the IPA vowel chart above, vowels consist of the following types of articulation:

- **Height** measures the height of the tongue positioned relative to its initial position. From bottom to top, degrees of vowel height range from open to close. "Open vowels" (also known as "low vowels") are vowels characterized by the tongue positioned close to the roof/palate of the mouth. "Top vowels" (also known as "high vowels") are vowels characterized by the tongue positioned far away from the roof/palate of the mouth.
- **Backness** measures the position of the tongue relative to the back of the mouth. From left to right, degrees of vowel backness range from front to back. "Front vowels" (also known as "bright vowels") are vowels characterized by the tongue positioned in front of the mouth. "Back vowels" (also known as "dark vowels") are vowels characterized by the tongue positioned back of the mouth.
- **Roundedness** characterizes the roundedness of the lips during the articulation.

Since the sound constriction is relative to the front vowels (i, u, y) and the nasalization, there are conditions that must be included to assure the readings sound neither alike nor ambiguous. For Table 3.2b,

- If 一𠂔 were to have the IPA reading /jän/, then it would sound closer to the weak version of 一𠂔 (as 𠂔 contains /ɑ/, which belongs to the same vowel backness category with /a/ and /ä/), which is regular. Therefore, the reading of 𠂔 changes.
- If 一𠂔 were to have the IPA reading /jən/ (similar to the word "yen"), that would suggest /ə/ acts as a vowel. The issue is that the transition between /j/ and /ə/ does not work. As mentioned earlier, 一 and 𠂔 both have same vowel height and same

vowel backness; it follows that because of their long vowel readings, the vowel contrast is developed. Thus, the vowel of ㄣ is dropped.

- By the similar reason, the vowel of ㄥ is dropped for ㄣ. That is because it sounds close to the actual ㄣㄥ with /ɤ/ changed to /ʊ/.

For Table 3.2c, ㄨㄥ has the IPA reading /wɤŋ/, which works differently from /wəŋ/. Some articles include the IPA reading /wəŋ/, which suggests that ㄥ emphasizes the mid-central vowel /ə/. That describes the tongue positioned halfway between a close vowel and an open vowel, but also between a front vowel and a back vowel. The issue is that because of the transition between rounded ㄨ and unrounded ㄥ, /wə/ is stressed more than /ŋ/. In that case, it sounds closer to ㄨㄣ, which constitutes vague nasalization of ㄥ.

Remark. ㄨㄥ can also sound close to /wɔŋ/, which was discovered by the Ministry of Education in 1941. The standards 十八韻 (*shíbāyùn*; ㄖㄨˋ ㄘㄩˋ ㄣㄣˋ), which is "18 Finals", listed 18 different finals from combining 介音 with 韻母. Playing around with ㄥ,

- For 十七庚, they found ㄥ and ㄣ, which corresponds to the final of 庚 (*gēng*, ㄍㄥ).
- For 十八東, they found ㄨㄥ and ㄣㄥ, which corresponds to the final of 東 (*dōng*, ㄉㄨㄥ).

While ㄨㄥ was supposed to be in 十七庚 (so that its reading is /wɤŋ/), it officially has more than one possible reading; there is no clear difference when ㄨㄥ is read. Thus, it is possible to transform the vowel of ㄨ from /u/ to /ʊ/ while dropping /ɤ/. On the other hand, when transliterated in *pīnyīn*, the reading changes.

Finally, for Table 3.2d,

- ㄣ in ㄣㄣ changes, following ㄣ.
- ㄣ in ㄣㄣ changes, following ㄣ and ㄣ.
- What makes ㄣ different from the rest of the finals is that it stresses the vowel roundedness. ㄣ is a rounded vowel, whereas the standard reading of ㄥ is an unrounded vowel. Consequently, the roundedness changes drastically during the articulation. To solve this issue, the order of roundedness is reversed, so that the round vowel /ʊ/ comes at the end.

例 (Example)

陰_ㄣ 影_ㄣ 孕_ㄣ 育_ㄣ

Notice that from the previous example, the first three characters consist of 鼻韻母. After reading each set of ruby characters, we notice that

- 陰 contains 一 and ㄣ. Since the vowel of 一 is stressed more than the vowel of ㄣ, the vowel of ㄣ is dropped. Therefore, the nasalization comes directly after 一.
- For 影, the vowel drop follows what we discussed.
- 孕 combined with the character 育 is the ㄣ-version of 陰, but with 聲調. Therefore, the nasalization comes directly after ㄣ.

Before you proceed to the exercises, read the information, starting at Section 3. Then, try out the following exercises to the best of your ability without looking. The answers to those problems can be found, starting in Page 56.

問題 1 (Exercise 1)

Transcribe each of the following *pīnyīn* readings as accurately as possible, using only 注音 characters we learned since Section 2. However, do not use 複韻母, 鼻韻母 nor 儿 for the transcriptions.

- | | |
|-----------|-----------|
| (i) yu | (v) wen |
| (ii) yao | (vi) yong |
| (iii) yan | (vii) yun |
| (iv) ying | (viii) er |

問題 2 (Exercise 2)

Determine the *exact* final place of contact within the mouth when either ㄨ or ㄣ is pronounced. You may write your response in either Chinese or English for this exercise.

問題 3 (Exercise 3)

Practice all finals that we learned in this section.

4 Taiwanese Mandarin Zhuyin Combinations 〈國音注音組合〉

Important: Read the previous sections and also try as many *Exercises* as you can!

Throughout this section, all combinations contain 聲母 all ordered according to MPS Index. They are verified by the current standards of 國語. New combinations and variant readings, like ㄅㄣ and ㄅㄣ, are not included. You may consult the most recently updated 注音 table.

The method for practicing combinations, containing 聲母, is similar to the previous one in Subsection 3.2. Since there are more characters involved, there are different variations of practicing combinations, such as

1. Read each character from left to right. Then, read everything.
2. Read 聲母 and then the final. Finally, read everything.
3. Focus on reading the final before reading everything. That is because 聲母 sound does not change.
4. Focus on reading the final and then, with 聲調. Finally, read everything.

例(Example)

蜘蛛俠 非常混亂

Literal translation: Spiderman is very chaotic.

The sentence above is read as (蜘蛛俠)(非常)(混亂), where 蜘蛛 (spider) and 俠 (hero) can be read altogether. Therefore, we count two small pauses.

No matter which of the methods is best for practice reading 漢字, the result is the same. To search for approximate readings in this guide, look up by their 聲母.

4.1 ㄅㄆㄇㄊ

Table 4.1a. ㄩ-Final Group (「ㄩ」的組合)	
Finals	Combinations
ㄩ	ㄅㄩ, ㄆㄩ, ㄇㄩ, ㄊㄩ
ㄛ	ㄅㄛ, ㄆㄛ, ㄇㄛ, ㄊㄛ
ㄜ	ㄇㄜ
ㄝ	ㄅㄝ (ㄅㄩㄝ), ㄆㄝ (ㄆㄩㄝ), ㄇㄝ (ㄇㄩㄝ)
ㄞ	ㄅㄞ (ㄅㄩㄞ), ㄆㄞ (ㄆㄩㄞ), ㄇㄞ (ㄇㄩㄞ), ㄊㄞ (ㄊㄩㄞ)
ㄟ	ㄅㄟ (ㄅㄩㄟ), ㄆㄟ (ㄆㄩㄟ), ㄇㄟ (ㄇㄩㄟ), ㄊㄟ (ㄊㄩㄟ)
ㄠ	ㄅㄠ (ㄅㄩㄠ), ㄆㄠ (ㄆㄩㄠ), ㄇㄠ (ㄇㄩㄠ), ㄊㄠ (ㄊㄩㄠ)
ㄡ	ㄅㄡ (ㄅㄩㄡ), ㄆㄡ (ㄆㄩㄡ), ㄇㄡ (ㄇㄩㄡ), ㄊㄡ (ㄊㄩㄡ)
ㄣ	ㄅㄣ (ㄅㄩㄣ), ㄆㄣ (ㄆㄩㄣ), ㄇㄣ (ㄇㄩㄣ), ㄊㄣ (ㄊㄩㄣ)
ㄤ	ㄅㄤ (ㄅㄩㄤ), ㄆㄤ (ㄆㄩㄤ), ㄇㄤ (ㄇㄩㄤ), ㄊㄤ (ㄊㄩㄤ)
ㄥ	ㄅㄥ (ㄅㄩㄥ), ㄆㄥ (ㄆㄩㄥ), ㄇㄥ (ㄇㄩㄥ), ㄊㄥ (ㄊㄩㄥ)
Table 4.1b. ㄟ-Final Group (「ㄟ」的組合)	
Finals	Combinations
ㄟ	ㄅㄟ, ㄆㄟ, ㄇㄟ
ㄟㄝ	ㄅㄟㄝ, ㄆㄟㄝ, ㄇㄟㄝ
ㄟㄠ	ㄅㄟㄠ (ㄅㄩㄠ), ㄆㄟㄠ (ㄆㄩㄠ), ㄇㄟㄠ (ㄇㄩㄠ)
ㄟㄡ	ㄇㄟㄡ (ㄇㄩㄡ)
ㄟㄣ	ㄅㄟㄣ (ㄅㄩㄣ), ㄆㄟㄣ (ㄆㄩㄣ), ㄇㄟㄣ (ㄇㄩㄣ)
ㄟㄤ	ㄅㄟㄤ (ㄅㄩㄤ), ㄆㄟㄤ (ㄆㄩㄤ), ㄇㄟㄤ (ㄇㄩㄤ)
ㄟㄥ	ㄅㄟㄥ (ㄅㄩㄥ), ㄆㄟㄥ (ㄆㄩㄥ), ㄇㄟㄥ (ㄇㄩㄥ)
Table 4.1c. ㄨ-Final Group (「ㄨ」的組合)	
Finals	Combinations
ㄨ	ㄅㄨ, ㄆㄨ, ㄇㄨ, ㄊㄨ

1. The origin of the titular characters ㄅㄆㄇㄊ started with readings ㄅㄨㄛ, ㄆㄨㄛ, ㄇㄨㄛ, ㄊㄨㄛ and ㄊㄨㄛ. Since these combinations exist in some Mandarin dialects, but not in 國語, ㄨ is excluded. Therefore, ㄅㄆㄇㄊ comes from the actual readings ㄅㄛ, ㄆㄛ, ㄇㄛ and ㄊㄛ.
2. As 唇音 (Table 1; Section 2), ㄅ, ㄆ, ㄇ and ㄊ are the only common 聲母, such that when combined with ㄨ, their sounds are different from the rest of others. That is because there are no combinations associated with ㄨㄨ nor ㄨㄨ.
3. For ㄟ-final group, there is no ㄊ-combination since ㄊ contains a fricative consonant.

4. There is no \sqcup -final combination since \sqcup would vaguely sound closer to \neg (Subsection 3.2).

4.2 ㄉㄜㄣㄌㄞ

Table 4.2a. ㄚ-Final Group (「ㄚ」的組合)

Finals	Combinations
ㄚ	ㄉㄚ, ㄊㄚ, ㄋㄚ, ㄌㄚ
ㄛ	ㄌㄛ
ㄜ	ㄉㄜ, ㄊㄜ, ㄋㄜ, ㄌㄜ
ㄝ	ㄉㄝ (ㄉㄚ一), ㄊㄝ (ㄊㄚ一), ㄋㄝ (ㄋㄚ一), ㄌㄝ (ㄌㄚ一)
ㄞ	ㄉㄞ (ㄉㄚㄝ), ㄊㄞ (ㄊㄚㄝ), ㄋㄞ (ㄋㄚㄝ), ㄌㄞ (ㄌㄚㄝ)
ㄟ	ㄉㄟ (ㄉㄚㄟ), ㄊㄟ (ㄊㄚㄟ), ㄋㄟ (ㄋㄚㄟ), ㄌㄟ (ㄌㄚㄟ)
ㄠ	ㄉㄠ (ㄉㄚㄠ), ㄊㄠ (ㄊㄚㄠ), ㄋㄠ (ㄋㄚㄠ), ㄌㄠ (ㄌㄚㄠ)
ㄡ	ㄌㄡ (ㄌㄚㄡ)
ㄣ	ㄉㄣ (ㄉㄚㄣ), ㄊㄣ (ㄊㄚㄣ), ㄋㄣ (ㄋㄚㄣ), ㄌㄣ (ㄌㄚㄣ)
ㄤ	ㄉㄤ (ㄉㄚㄤ), ㄊㄤ (ㄊㄚㄤ), ㄋㄤ (ㄋㄚㄤ), ㄌㄤ (ㄌㄚㄤ)

Table 4.2b. ㄟ-Final Group (「ㄟ」的組合)

Finals	Combinations
ㄟ	ㄉㄟ, ㄊㄟ, ㄋㄟ, ㄌㄟ
ㄟㄚ	ㄉㄟㄚ, ㄊㄟㄚ
ㄟㄛ	ㄉㄟㄛ, ㄊㄟㄛ, ㄋㄟㄛ, ㄌㄟㄛ
ㄟㄜ	ㄉㄟㄜ (ㄉㄟㄚㄝ), ㄊㄟㄜ (ㄊㄟㄚㄝ), ㄋㄟㄜ (ㄋㄟㄚㄝ), ㄌㄟㄜ (ㄌㄟㄚㄝ)
ㄟㄝ	ㄉㄟㄝ (ㄉㄟㄚㄟ), ㄊㄟㄝ (ㄊㄟㄚㄟ), ㄋㄟㄝ (ㄋㄟㄚㄟ), ㄌㄟㄝ (ㄌㄟㄚㄟ)
ㄟㄞ	ㄉㄟㄞ (ㄉㄟㄚㄠ), ㄊㄟㄞ (ㄊㄟㄚㄠ), ㄋㄟㄞ (ㄋㄟㄚㄠ), ㄌㄟㄞ (ㄌㄟㄚㄠ)
ㄟㄟ	ㄌㄟㄟ (ㄌㄟㄚㄡ)
ㄟㄠ	ㄉㄟㄠ (ㄉㄟㄚㄠ), ㄊㄟㄠ (ㄊㄟㄚㄠ), ㄋㄟㄠ (ㄋㄟㄚㄠ)
ㄟㄡ	ㄉㄟㄡ (ㄉㄟㄚㄡ), ㄊㄟㄡ (ㄊㄟㄚㄡ), ㄋㄟㄡ (ㄋㄟㄚㄡ), ㄌㄟㄡ (ㄌㄟㄚㄡ)

Table 4.2c. ㄨ-Final Group (「ㄨ」的組合)

Finals	Combinations
ㄨ	ㄉㄨ, ㄊㄨ, ㄋㄨ, ㄌㄨ
ㄨㄛ	ㄉㄨㄛ, ㄊㄨㄛ, ㄋㄨㄛ, ㄌㄨㄛ
ㄨㄜ	ㄉㄨㄜ (ㄉㄨㄚㄝ), ㄊㄨㄜ (ㄊㄨㄚㄝ)
ㄨㄝ	ㄉㄨㄝ (ㄉㄨㄚㄟ), ㄊㄨㄝ (ㄊㄨㄚㄟ), ㄋㄨㄝ (ㄋㄨㄚㄟ), ㄌㄨㄝ (ㄌㄨㄚㄟ)
ㄨㄞ	ㄉㄨㄞ (ㄉㄨㄚㄠ), ㄊㄨㄞ (ㄊㄨㄚㄠ), ㄋㄨㄞ (ㄋㄨㄚㄠ), ㄌㄨㄞ (ㄌㄨㄚㄠ)
ㄨㄟ	ㄉㄨㄟ (ㄉㄨㄚㄡ), ㄊㄨㄟ (ㄊㄨㄚㄡ), ㄋㄨㄟ (ㄋㄨㄚㄡ), ㄌㄨㄟ (ㄌㄨㄚㄡ)

Table 4.2d. ㄌ-Final Group (「ㄌ」的組合)	
Finals	Combinations
ㄌ	ㄌㄌ, ㄌㄌ
ㄌㄝ	ㄌㄌㄝ, ㄌㄌㄝ
ㄌㄣ	ㄌㄌㄣ (ㄌㄌㄣㄣ)

1. After ㄌㄣㄣ come 齒齶音, which are ㄌ, ㄣ, ㄌ and ㄌ. They are respectively read as ㄌㄣ, ㄣㄣ, ㄌㄣ and ㄌㄣ.
2. ㄌ is currently the only 齒齶音 that can be combined with ㄣ in 國語 case.

4.3 ‹‹ㄣ›

Table 4.3a. ㄣ-Final Group (「ㄣ」的組合)	
Finals	Combinations
ㄣ	‹‹ㄣ, ㄣㄣ, ㄣㄣ›
ㄣ	‹‹ㄣ, ㄣㄣ, ㄣㄣ›
ㄣ	‹‹ㄣ (‹‹ㄣ一›), ㄣㄣ (ㄣㄣ一), ㄣㄣ (ㄣㄣ一›)›
ㄣ	‹‹ㄣ (‹‹ㄣ一›), ㄣㄣ (ㄣㄣ一›)›
ㄣ	‹‹ㄣ (‹‹ㄣㄣ›), ㄣㄣ (ㄣㄣㄣ), ㄣㄣ (ㄣㄣㄣ›)›
ㄣ	‹‹ㄣ (‹‹ㄣㄣ›), ㄣㄣ (ㄣㄣㄣ), ㄣㄣ (ㄣㄣㄣ›)›
ㄣ	‹‹ㄣ (‹‹ㄣㄣ›), ㄣㄣ (ㄣㄣㄣ), ㄣㄣ (ㄣㄣㄣ›)›
ㄣ	‹‹ㄣ (‹‹ㄣㄣ›), ㄣㄣ (ㄣㄣㄣ), ㄣㄣ (ㄣㄣㄣ›)›
ㄣ	‹‹ㄣ (‹‹ㄣㄣ›), ㄣㄣ (ㄣㄣㄣ), ㄣㄣ (ㄣㄣㄣ›)›
ㄣ	‹‹ㄣ (‹‹ㄣㄣ›), ㄣㄣ (ㄣㄣㄣ), ㄣㄣ (ㄣㄣㄣ›)›
Table 4.3b. ㄣ-Final Group (「ㄣ」的組合)	
Finals	Combinations
ㄣ	‹‹ㄣ, ㄣㄣ, ㄣㄣ›
ㄣㄣ	‹‹ㄣㄣ, ㄣㄣㄣ, ㄣㄣㄣ›
ㄣㄣ	‹‹ㄣㄣ, ㄣㄣㄣ, ㄣㄣㄣ›
ㄣㄣ	‹‹ㄣㄣ (‹‹ㄣㄣ一›), ㄣㄣㄣ (ㄣㄣㄣ一), ㄣㄣㄣ (ㄣㄣㄣ一›)›
ㄣㄣ	‹‹ㄣㄣ (‹‹ㄣㄣ一›), ㄣㄣㄣ (ㄣㄣㄣ一), ㄣㄣㄣ (ㄣㄣㄣ一›)›
ㄣㄣ	‹‹ㄣㄣ (‹‹ㄣㄣㄣ›), ㄣㄣㄣ (ㄣㄣㄣㄣ), ㄣㄣㄣ (ㄣㄣㄣㄣ›)›
ㄣㄣ	‹‹ㄣㄣ (‹‹ㄣㄣ›), ㄣㄣㄣ (ㄣㄣㄣ), ㄣㄣㄣ (ㄣㄣㄣ›)›
ㄣㄣ	‹‹ㄣㄣ (‹‹ㄣㄣㄣ›), ㄣㄣㄣ (ㄣㄣㄣㄣ), ㄣㄣㄣ (ㄣㄣㄣㄣ›)›
ㄣㄣ	‹‹ㄣㄣ (‹‹ㄣㄣ›), ㄣㄣㄣ (ㄣㄣㄣ), ㄣㄣㄣ (ㄣㄣㄣ›)›

1. After ㄣ, ㄣ, ㄣ and ㄣ come 軟齶音, which are ‹‹, ㄣ and ㄣ. They are respectively read as ‹‹ㄣ, ㄣㄣ and ㄣㄣ.
2. There is no 一-combination. As 軟齶音 (Table 1; Section 2), since the back of the tongue is in contact with the soft palate during the consonant articulation, that restricts its ability to produce the vowel sound.
3. There is no ㄣ-combination, following that ㄣ has the same vowel backness and vowel height as 一 (Subsection 3.2).

4.4 ㄣ ㄣ ㄣ

Table 4.4a. ㄣ-Final Group (「ㄣ」的組合)	
Finals	Combinations
ㄣ	ㄣㄣ, ㄣㄣ, ㄣㄣ
ㄣㄣ	ㄣㄣㄣ, ㄣㄣㄣ, ㄣㄣㄣ
ㄣㄣ	ㄣㄣㄣ, ㄣㄣㄣ, ㄣㄣㄣ
ㄣㄣ	ㄣㄣㄣ (ㄣㄣㄣㄣ), ㄣㄣㄣ (ㄣㄣㄣㄣ), ㄣㄣㄣ (ㄣㄣㄣㄣ)
ㄣㄣ	ㄣㄣㄣ (ㄣㄣㄣㄣ), ㄣㄣㄣ (ㄣㄣㄣㄣ), ㄣㄣㄣ (ㄣㄣㄣㄣ)
ㄣㄣ	ㄣㄣㄣ (ㄣㄣㄣㄣ), ㄣㄣㄣ (ㄣㄣㄣㄣ), ㄣㄣㄣ (ㄣㄣㄣㄣ)
ㄣㄣ	ㄣㄣㄣ (ㄣㄣㄣㄣ), ㄣㄣㄣ (ㄣㄣㄣㄣ), ㄣㄣㄣ (ㄣㄣㄣㄣ)
ㄣㄣ	ㄣㄣㄣ (ㄣㄣㄣㄣ), ㄣㄣㄣ (ㄣㄣㄣㄣ), ㄣㄣㄣ (ㄣㄣㄣㄣ)
ㄣㄣ	ㄣㄣㄣ (ㄣㄣㄣㄣ), ㄣㄣㄣ (ㄣㄣㄣㄣ), ㄣㄣㄣ (ㄣㄣㄣㄣ)
Table 4.4b. ㄣ-Final Group (「ㄣ」的組合)	
Finals	Combinations
ㄣ	ㄣㄣ, ㄣㄣ, ㄣㄣ
ㄣㄣ	ㄣㄣㄣ, ㄣㄣㄣ, ㄣㄣㄣ
ㄣㄣ	ㄣㄣㄣ (ㄣㄣㄣㄣ), ㄣㄣㄣ (ㄣㄣㄣㄣ), ㄣㄣㄣ (ㄣㄣㄣㄣ)
ㄣㄣ	ㄣㄣㄣ (ㄣㄣㄣㄣ), ㄣㄣㄣ (ㄣㄣㄣㄣ), ㄣㄣㄣ (ㄣㄣㄣㄣ)
ㄣㄣ	ㄣㄣㄣ (ㄣㄣㄣㄣ), ㄣㄣㄣ (ㄣㄣㄣㄣ), ㄣㄣㄣ (ㄣㄣㄣㄣ)

1. After ㄣ, ㄣ and ㄣ come 舌冠音, which are ㄣ, ㄣ and ㄣ. Unlike the previous, they are respectively read as ㄣㄣ, ㄣㄣ and ㄣㄣ. Therefore, the only 介音 that work are ㄣ and ㄣ since they have common vowel height and vowel backness (Subsection 3.2).
2. There is neither ㄣ-final combination nor ㄣ-final combination since the vowel sound will always be heard, starting with either ㄣ and ㄣ instead of the next vowel positioned (i.e. ㄣ, ㄣ, ㄣ).

4.5 虫彳尸日

Table 4.5a. Y-Final Group (「Y」的組合)

Finals	Combinations
∅	出, 彳, 尸, 回
丫	出丫, 彳丫, 尸丫
ㄗ	出ㄗ, 彳ㄗ, 尸ㄗ, 回ㄗ
𠂇	出𠂇 (出丫一), 彳𠂇 (彳丫一), 尸𠂇 (尸丫一)
ㄟ	出ㄟ (出ㄗ一), 尸ㄟ (尸ㄗ一)
么	出么 (出丫X), 彳么 (彳丫X), 尸么 (尸丫X), 回么 (回丫X)
又	出又 (出ㄗX), 彳又 (彳ㄗX), 尸又 (尸ㄗX), 回又 (回ㄗX)
𠂇	出𠂇 (出丫𠂇), 彳𠂇 (彳丫𠂇), 尸𠂇 (尸丫𠂇), 回𠂇 (回丫𠂇)
ㄣ	出ㄣ (出ㄗ𠂇), 彳ㄣ (彳ㄗ𠂇), 尸ㄣ (尸ㄗ𠂇), 回ㄣ (回ㄗ𠂇)
尢	出尢 (出丫厶), 彳尢 (彳丫厶), 尸尢 (尸丫厶), 回尢 (回丫厶)
厶	出厶 (出ㄗ厶), 彳厶 (彳ㄗ厶), 尸厶 (尸ㄗ厶), 回厶 (回ㄗ厶)

Table 4.5b. X-Final Group (「X」の組合)

Finals	Combinations
X	⊕X, ♂X, ♀X, □X
XY	⊕XY, ♂XY, ♀XY
X \overline{Y}	⊕X \overline{Y} , ♂X \overline{Y} , ♀X \overline{Y} , □X \overline{Y}
X \overline{Y}	⊕X \overline{Y} (⊕XY—), ♂X \overline{Y} (♂XY—), ♀X \overline{Y} (♀XY—)
X \overline{Y}	⊕X \overline{Y} (⊕Xせ—), ♂X \overline{Y} (♂Xせ—), ♀X \overline{Y} (♀Xせ—), □X \overline{Y} (□Xせ—)
X \overline{Y}	⊕X \overline{Y} (⊕XY \overline{Y}), ♂X \overline{Y} (♂XY \overline{Y}), ♀X \overline{Y} (♀XY \overline{Y}), □X \overline{Y} (□XY \overline{Y})
X \overline{Y}	⊕X \overline{Y} (⊕X \overline{Y}), ♂X \overline{Y} (♂X \overline{Y}), ♀X \overline{Y} (♀X \overline{Y}), □X \overline{Y} (□X \overline{Y})
X \overline{Y}	⊕X \overline{Y} (⊕XY \overline{Y}), ♂X \overline{Y} (♂XY \overline{Y}), □X \overline{Y} (□XY \overline{Y})
X \overline{Y}	⊕X \overline{Y} (⊕X \overline{Y}), ♂X \overline{Y} (♂X \overline{Y}), □ \overline{Y} X (□X \overline{Y})

1. After ㄐ, ㄑ and ㄒ come 翹舌音, which are ㄗ, ㄘ, ㄙ and ㄣ. Those contain the minimal vowel ㄩ (Section 2).
2. Note that ㄗ, ㄘ, ㄙ and ㄣ produce ㄩ, where the vowel is pronounced with friction. Since ㄣ and ㄣ extends ㄩ, which would sound more like ㄣ, there is neither ㄣ-combination nor ㄣ-combination.

4.6 ㄆㄑㄇ

Table 4.6a. ㄚ-Final Group (「ㄚ」的組合)	
Finals	Combinations
∅	ㄆ, ㄑ, ㄇ
ㄚ	ㄆㄚ, ㄑㄚ, ㄇㄚ
ㄝ	ㄆㄝ, ㄑㄝ, ㄇㄝ
ㄛ	ㄆㄛ (ㄆㄚㄣ), ㄑㄛ (ㄑㄚㄣ), ㄇㄛ (ㄇㄚㄣ)
ㄟ	ㄆㄟ (ㄆㄝㄣ)
ㄡ	ㄆㄡ (ㄆㄚㄨ), ㄑㄡ (ㄑㄚㄨ), ㄇㄡ (ㄇㄚㄨ)
ㄣ	ㄆㄣ (ㄆㄝㄣ), ㄑㄣ (ㄑㄚㄣ), ㄇㄣ (ㄇㄝㄣ)
ㄥ	ㄆㄥ (ㄆㄚㄥ), ㄑㄥ (ㄑㄚㄥ), ㄇㄥ (ㄇㄚㄥ)
ㄨ	ㄆㄨ (ㄆㄚㄨ), ㄑㄨ (ㄑㄚㄨ), ㄇㄨ (ㄇㄚㄨ)
ㄩ	ㄆㄩ (ㄆㄚㄩ), ㄑㄩ (ㄑㄚㄩ), ㄇㄩ (ㄇㄚㄩ)
Table 4.6b. ㄨ-Final Group (「ㄨ」的組合)	
Finals	Combinations
ㄨ	ㄆㄨ, ㄑㄨ, ㄇㄨ
ㄨㄝ	ㄆㄨㄝ, ㄑㄨㄝ, ㄇㄨㄝ
ㄨㄟ	ㄆㄨㄟ (ㄆㄨㄝㄣ), ㄑㄨㄟ (ㄑㄨㄝㄣ), ㄇㄨㄟ (ㄇㄨㄝㄣ)
ㄨㄣ	ㄆㄨㄣ (ㄆㄨㄚㄥ), ㄑㄨㄣ (ㄑㄨㄚㄥ), ㄇㄨㄣ (ㄇㄨㄚㄥ)
ㄨㄥ	ㄆㄨㄥ (ㄆㄨㄚㄥ), ㄑㄨㄥ (ㄑㄨㄚㄥ), ㄇㄨㄥ (ㄇㄨㄚㄥ)
ㄨㄨ	ㄆㄨㄨ (ㄆㄨㄚㄨ), ㄑㄨㄨ (ㄑㄨㄚㄨ), ㄇㄨㄨ (ㄇㄨㄚㄨ)

1. After ㄅ, ㄆ, ㄑ and ㄒ come 平舌音, which are ㄆ, ㄑ and ㄇ. Those contain the minimal vowel ㄅ (Section 2).
2. Note that ㄆ, ㄑ and ㄇ produce ㄅ, where the vowel is pronounced with friction. Since ㄣ and ㄥ extends ㄅ, which would sound more like ㄣ, there is neither ㄣ-combination nor ㄥ-combination.

The final part tests your general knowledge of concepts covered for Standard Mandarin. Try to work out all exercises entirely from your heart before checking the answers in Page 56, 57. Good luck!

問題 1 (Exercise 1)

For each of the following statements, determine whether it is true (正) or false (誤):

- (i) According to the method of registering readings, the next reading to be checked after ㄅㄛ is ㄅㄛˊ.
- (ii) There are natives who pronounce ㄘㄥ as ㄘㄜㄢ mainly because of Mandarin dialects.
- (iii) The standard number of 筆畫 per written character is unique for all standards.

問題 2 (Exercise 2)

嗯_ㄣ, 嗯_{ㄣˊ}, 嗯_{ㄣˊˊ}, 嗯_{ㄣˊˊˊ}

The character 嗯 consists of the components 口 (mouth) and 恩 (kindness). Since 恩 has the reading ㄣˊ, it sounds close the third reading of 嗯 as shown above, which makes 嗯 phonosemantic. The reading ㄣˊˊ is the standard reading in all Mandarin dialects. However, other three readings are also standard. Considering only the components and ruby readings given, explain how that is possible. Do not define 嗯.

Assumption: The character 嗯 has the same meaning for all four distinct readings.

問題 3 (Exercise 3)

華_{ㄏㄨㄚˊ}, 語_{ㄩˊ}, 學_{ㄒㄩㄝˊ}, 習_{ㄒㄧˊ},
學_{ㄒㄩㄝˊ}, 習_{ㄒㄧˊ}, 華_{ㄏㄨㄚˊ}, 語_{ㄩˊ}

Both statements are roughly translated as "Mandarin Chinese learning" or "learning Mandarin Chinese", where

- 華語, which is literally "Chinese language", is "Mandarin Chinese".
- 學習, which is literally "learn/study familiarize/habit", is "to learn" or "to acquire knowledge".

Suppose we exclude 習, so that we have

華_{ㄏㄨㄚˊ}, 語_{ㄩˊ}, 學_{ㄒㄩㄝˊ},
學_{ㄒㄩㄝˊ}, 華_{ㄏㄨㄚˊ}, 語_{ㄩˊ}

In Mandarin, natives can understand 學華語 ("to learn Chinese"), but not 華語學 ("Chinese learn"). Determine why removing 習 poses a significant difference.

Fun Remark. This Exercise follows the linguistic term "prosody", which plays an important role in Chinese languages. It reflects how syllables interact with the important aspects of a language. As a hint, consider how those ruby characters are pronounced.

問題 4 (Exercise 4)

的_{ㄉㄜˊ} 的_{ㄉㄜˊ} ㄉㄜˊ

The character 的 is popular known for its grammatical purposes. Majority of Mandarin Chinese learning courses and guides treat 的 as ㄉㄜˊ for that case. However, there also exist other readings that serve same purposes as 的:

- ㄉㄜˊ is emphasized in some dialects.
- The character ㄉㄜˊ is the Internet slang used to express 的.

Determine whether or not that ㄉㄜˊ can have the same pronunciation (with same tone) as either one of two readings on the left. If so, indicate one. Otherwise, disprove these readings are entirely distinct.

問題 5 (Exercise 5)

黃_{ㄏㄨㄤˊ} 鼠_{ㄕㄨˇ} 狼_{ㄌㄤˊ} 給_{ㄓㄜˊ} 雞_{ㄐㄧ} 拜_{ㄅㄞˋ} 年_{ㄋㄢˊ}

Literal translation: The weasel pays the chicken a courtesy call on New Year's Day.

Idiomatic meaning: Greeks bearing gifts; wolf in sheep's clothing

The statement above can be broken down as follows:

- 黃 means "yellow".
- 鼠 means "squirrel".
- 狼 means "wolf".
- 給 means "to give".
- 雞 means "chicken".
- 拜年 means "to exchange New Year's greetings".

Determine the total number of small pauses needed to make for reading that statement.

Fun Remark. 黃鼠狼給雞拜年——沒安好心 is 歇後語 (ㄒㄧㄝ ㄏㄜˋ ㄅㄛˋ), which is an idiomatic two-part pun. The first part presents a novel scenario, whereas the last part provides a meaning to the first. One English example is "An apple a day (keeps the doctor away)". For Exercise 5, 黃鼠狼給雞拜年 is the first part, whereas 沒安好心 is the last.

Solutions to Exercises 〈答案〉

The following are answers (along with learning and answering tactics) to the exercises.

Subsection 1.1

問題 1 (Exercise 1)

By the tell of the strokes and the pattern, we see that the characters are almost in "alphabetical" order! However, we have a mixture of 介音 and 韻母, which are all individual vowels (Section 3). :)

- | | | | | |
|------------|------------|------------|------------|------------|
| (a) ㄚ - 韻母 | (e) ㄞ - 韻母 | (i) ㄟ - 介音 | (m) ㄟ - 聲母 | (q) ㄟ - 介音 |
| (b) ㄛ - 聲母 | (f) ㄟ - 聲母 | (j) ㄟ - 聲母 | (n) ㄟ - 韻母 | (r) ㄟ - 介音 |
| (c) ㄜ - 聲母 | (g) ㄟ - 聲母 | (k) ㄟ - 聲母 | (o) ㄟ - 聲母 | (s) ㄟ - 聲母 |
| (d) ㄝ - 聲母 | (h) ㄟ - 聲母 | (l) ㄟ - 聲母 | (p) ㄟ - 聲母 | (t) ㄟ - 聲母 |

問題 2 (Exercise 2)

One of the tactics is to directly count numbers of characters. However, there is also another tactic, involving the visualization and the material we have learned. The beauty behind this problem is that it tests how well one relies on applications and strategies.



From Table 1d, we see that here are five 聲調 involved in inputting 注音. However, since Tone 1 is "usually omitted", then we have four 聲調 keys on the keyboard as shown above. So as the Fun Remark hints, these keys correspond to the white (or unlabeled) cells in Table 1. We finally see that

- 聲母 resembles an irregular shape in the formation of 4-4-3-3-4-3.
- 介音 resembles a rectangle.
- 韻母 resembles an irregular shape in the formation of 4-4-4-1.

Because it would be odd to position 聲調 keys elsewhere, it is common to see 虫 positioned between two pairs of 恆掉. Also, since 虫彳尸日 is the only 4-character set between 丩<丌 and 丌ㄣム, 虫 key appears on front. So altogether, we have

- $4 \times 6 - 3 = 21$ 聲母;
- 3 介音;
- And $4 \times 4 - 3 = 13$ 韻母

Therefore, the answers to all parts of the exercise are:

- (a) $21 - (20 - 3 - 3) = 7$ 聲母, following the answers from Exercise 1 and what we discovered.
- (b) 0 介音 since 介音 are all individual vowels.
- (c) $13 - 3 = 10$ 韻母 by the similar reason.

問題 3 (Exercise 3)

- (i) False (誤); the origin tables prove that there are multiple ways of expressing a character
- (ii) False (誤); no matter how many neutral-tone 漢字 there are, the reason all comes to how the reading is generated.
- (iii) False (誤); the origin of ㄗ sets the counterexample, which shows that ㄗ was derived from ㄗ.
- (iv) True (正); that follows the solution for Exercise 2.
- (v) False (誤); 注音 serves the purpose of guiding readers to know readings of 漢字. There are many other examples to justify that 注音 is useful.
- (vi) True (正); while it is common to see that readings have to be fully expressed with 注音, that is not always the case. Logically, 聲調 alone is a reading! It's actually acceptable for 聲母, 介音 and 韻母 to be empty! A straightforward example of applying 聲調 is instructing children to master tones while pronouncing. For a reading to be acceptable, it cannot be empty. It has to be presented in some way people can see.

Subsection 1.2

問題 1 (Exercise 1)

Consult Table 1 for all the correct answers.

問題 2 (Exercise 2)

- (i) False (誤); there are plenty of styles to represent a character as discussed in the Remark.
- (ii) True (正); the standards of characters are different in certain regions.
- (iii) True (正); 隸書 is an example to start with as we have seen different examples of same kind of script, but with varying thickness. There are many other examples to come up with.

- (iv) False (誤); the number 8 refers to the number of *decomposed* strokes. However, that is not the standard number of 筆畫! Therefore, if we consider 筆畫 tables, it can be reduced by treating each set of multiple adjacent strokes as one. The correct number of written 筆畫 is five.

Subsection 1.3

Exercise 1

From Table 3, we have Type 1 (聲母), Type 5 (韻母) and Type 6 (介音) characters. Since they are all individual characters, we order them in ascending type number. In this case, the correct order is

ㄅ, ㄆ, ㄇ, ㄈ, ㄌ, ㄋ, ㄍ, ㄏ, ㄔ, ㄕ, ㄖ, ㄗ, ㄛ, ㄣ, ㄨ, ㄟ, ㄨㄛ, ㄣㄨ, ㄣㄨㄛ

問題 2 (Exercise 2)

False (誤): there is no information that mentions MPS Index uses 漢字 once from the list. Since there exists some 漢字 with multiple readings, it is possible for a 漢字 to occur more than once.

問題 3 (Exercise 3)

Since the new list orders all characters in radicals, the characters introduced to list of common readings will eventually appear in the order of radicals and strokes. Therefore, no matter the total number of characters in the original list, the outcome is still the same (as long as the registering order does not change!).

Section 2

問題 1 (Exercise 1)

Consult Table 2 for answers to this exercise.

問題 2 (Exercise 2)

False (誤); the main body part that articulates for majority of consonants (not only in Chinese, but in any language!) is the tongue (舌). No matter how linguistic terms are defined in any language, relevant points of articulation around the roof of the mouth are identified by the changed position of the tongue.

問題 3 (Exercise 3)

With some clever strategy, the parts of Exercise 3 eventually become very simple to answer. To approach them, we consider only the givens without stressing phonology.

Since the characters provided are 聲母, whereas ㄟ contains a vowel, Step 1 and Step 3 tell us that there are at about two distinct tongue positions introduced. In this case, we learned that three distinct parameters are:

- The tongue position of ㄟ, which is unique.

- The initial tongue positions of 虫, 彳 and 尸, presumably the same.
- The initial tongue positions of 冫, ㄣ and 厶.

No matter which set you choose to pronounce, it is the tongue position that changes between 聲母 and 一, which offers us the clear hint to the tongue directions. If the initial positions are the same, then 聲母 are pronounced incorrectly. Likewise, if initial positions are different, but either of them are off, then one of the changes must be incorrect.

From what we inspected, we can answer each part as follows:

- Since the tongue is brought forward when 一 is pronounced, the extended 一 offers us better picture of the vowel contrast, concerning the relative tongue positions of 聲母.
- Following part (a), the initial tongue position of 聲母 is known. With that position kept in mind, we then know that the next position must be different. Tongue positions of 聲母 become more accurate when the method is repeated.
- Step 2 is optional. Following part (a), reading the extended 一 suffices. There is no need to introduce 啦 since tongue positions of the consonant ㄌ and 一 are close to each other.

Section 3

問題 1 (Exercise 1)

- | | |
|----------------|----------------|
| (i) yu - ㄩ | (v) wen - ㄨㄣ |
| (ii) yao - ㄧㄠ | (vi) yong - ㄩㄥ |
| (iii) yan - ㄧㄢ | (vii) yun - ㄩㄣ |
| (iv) ying - ㄧㄥ | (viii) er - ㄦ |

問題 2 (Exercise 2)

The answer to this Exercise is hard palate (硬顎), which is located between the soft palate and the uvula. While the correct answer seems to be "uvula" (懸雍垂), that type of articulation creates a sound similar to /N/ in 本 whose IPA reading is /hõN/.

問題 3 (Exercise 3)

Consult the readings from tables provided.

Section 4

問題 1 (Exercise 1)

- False (誤); since the next reading after ㄅ includes Tone 2 (risen from Tone 1 to Tone 2), the next reading is not ㄅ (Subsection 1.3).

- (ii) True (正); ㄅㄨ is pronounced in dialects, excluding 國語 (Section 3, Section 4), when it comes to ㄅㄨ.
- (iii) False (誤); in general, there is *no* unique standard of counting 筆畫 (Subsection 1.2).

問題 2 (Exercise 2)

The name "phonosemantic" suggests that there are at least two components involved: (1) "phono" component (sound) and (2) "semantic" component (meaning). Since 恩 hints the reading to 嗯, we can reasonably conclude that 口 would be a semantic component. So what we learned is that it suggests some meanings related to "mouth".

Reading each of the four readings out loud, we observe that ㄅ and ㄨ sounds are appended with Tone 2 (rising tone) (Subsection 1.1), which suggests that their nasalizations are related to the idea of the component 口. Thus, it hints that 恩 has something to do with interjection.

問題 3 (Exercise 3)

Since 華語 is an existing word, that forces 學 to be an isolate character. The issue is that since 學 is not extended by its adjacent component necessary to identify its purposes (whether they are based on grammar or semantics), it would be difficult to tell the actual meaning only from 學, which is usually treated as a verb instead of a noun. Therefore, the compound word 學習 is the word that can work as a noun "learning" (which comes from the suffix 習).

問題 4 (Exercise 4)

Since the individual character ㄉ has the reading ㄉㄜ, which is the part of 注音 system (Section 4), its reading is roughly close to the commonly taught 的 (leftmost).

問題 5 (Exercise 5)

No matter if the statement is idiomatic, it will always be the word itself that expresses the actual meaning for the scenario. If we follow the literal translation, we see that 黃鼠狼 is a subject involved in the scenario. Therefore, we have (黃鼠狼)(給)(雞)(拜年), which counts three small pauses.

Coming Soon! 〈即將推出〉

Next concepts for *Zhuyin Masterclass* series will cover range amount of topolects outside of Mandarin realm:

- Extended 注音
- Its relationship with Taiwanese kana
- Minnan and Hakka phonologies